27 Ag8r

AGRICULTURE EXPERIMENT STATION LIBRARY

APR 21 1952

PURDUE UNIVERSITY

Agricultural Economics RESEARCH

Contents for APRIL 1952 — *Vol.* IV, *No.* 2

Surveying Structural Level and Condition of Farmhouses — *Roy J. Burroughs* — 33

Factors Affecting the Domestic Mill Consumption of Cotton — *Frank Lowenstein* — 44

Consumer Acceptance or Consumer Preference — *Glenn L. Burrows* — 52

Book Reviews — *Max J. Wasserman, Bushrod W. Allin, Gustav F. Papanek, Nathan M. Koffsky, Karl Fox, Joseph E. Rickenbacker* — 57

UNITED STATES DEPARTMENT OF AGRICULTURE • Bureau of Agricultural Economics

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. — Price 20 cents

Contributors

Contributors are on the Staff of the Bureau of Agricultural Economics unless otherwise stated

ROY J. BURROUGHS is an international housing advisor in the Office of the Administrator of the Housing and Home Finance Agency. At the time the survey described by him in this issue was made, he was in charge of the Farm Construction Section of the Division of Agricultural Finance in BAE.

FRANK LOWENSTEIN, a member of the staff of the Division of Statistical and Historical Research, regularly analyzes the current situation and outlook for cotton.

GLENN L. BURROWS, a member of the statistical consulting unit of the Bureau, has been active in exploring the possibilities of applying to the solution of economic problems some of the experimental designs used in agronomy, biology, and engineering.

MAX J. WASSERMAN, long interested in problems of monopoly and free enterprise, is the author of *L'Oeuvre de la Federal Trade Commission*, which was awarded the France-Amerique prize in 1926. He is Special Assistant, Intelligence and Services, Office of International Trade, Department of Commerce, and teaches an evening class in Government Control of Business at Howard University.

BUSHROD W. ALLIN, chairman of the Outlook and Situation Board, is a student of economic theory who drew inspiration from John R. Commons and the Wisconsin group.

GUSTAV F. PAPANEK, formerly with the Office of the Chief of the Bureau, is now on the Program Planning Staff of the Asia Development Service, the Technical Cooperation Administration, Department of State (Point Four).

NATHAN KOFFSKY is Associate Head of the Division of Statistical and Historical Research and Vice Chairman of the Department's Outlook and Situation Board.

JOSEPH E. RICKENBACKER, from the University of Oregon, is a Research Interne in the Division of Marketing and Transportation Research under the Department's program in cooperation with the Land Grant College Association to train outstanding graduate students through employment on research projects in the Department.

KARL FOX is Head of the Division of Statistical and Historical Research.

Caroline B. Sherman, who was active in initiating Agricultural Economics Research *in January 1949, and who has been one of its editors since that time, retired from the Bureau of Agricultural Economics last October. She was a 'charter member' of BAE, coming into the Bureau when it was created in 1922. Last May, she received the Superior Service Award of the Department for "unusual effectiveness in writing, editing, and disseminating information to farmers and others, and for her skill in helping other authors to present their findings in a way well suited to their readers. . . ." Miss Sherman is succeeded by Charles E. Rogers. He was head of the journalism department at Kansas State College and later at Iowa State College, and was with FAO from 1946 to 1951. Herman Southworth continues to have primary responsibility for the technical content of the magazine.*

EDITORS: CHARLES E. ROGERS
HERMAN M. SOUTHWORTH

AGRICULTURAL ECONOMICS RESEARCH

A Journal of Economic and Statistical Research in the
Bureau of Agricultural Economics and Cooperating Agencies

Volume IV APRIL 1952 Number 2

Surveying Structural Level and Condition of Farmhouses

By Roy J. Burroughs

The Bureau of Agricultural Economics conducted in the winter and spring of 1950 a survey of farm housing and construction with funds available under the Housing Act of 1949. Funds for tabulating these data were not available in the Bureau until defense agencies requested in the summer of 1951 tabulations of those portions that might be useful or significant in estimating the needs for building materials in the maintenance and construction of farm homes and service buildings.[1] This article deals with methods for reporting structural level and condition of farmhouses used in the survey. Several Divisions of the Bureau and persons from other Agencies of the Department and the Land-Grant Colleges contributed to the undertaking. Much assistance was also obtained through the interagency Subcommittee on Housing Adequacy, which did experimental tests on adequacy over a period of several years. The author of this article served as subject-matter specialist on the project.

A NUMBER of new methods for reporting structural level and condition of farmhouses were tested in the survey of farm housing and construction conducted by the Bureau of Agricultural Economics in the winter and spring of 1950. This paper discusses the problems dealt with and the experience gained with the new methods. As used in this survey "structural level" denotes the basic durability, weather-tightness, and quality of workmanship, of the original construction; "condition" denotes the degree of deterioration.

[1] UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. FARM HOUSING AND CONSTRUCTION. Washington, D. C. February 1952. [Processed.]

Historical Background

Efforts to survey the quality of housing are not new. On the other hand, the careful analysis and objective reporting of structural level and condition of houses are comparatively new.

USDA

In 1934, for example, the then Bureau of Home Economics of the U. S. Department of Agriculture made a sample survey of farmhouses.[2] The schedule

[2] *The Farm Housing Survey*, Bureau of Home Economics in cooperation with Bureau of Agricultural Engineering, Extension Service, and Office of the Secretary. U. S. Dept. Agr. Misc. Pub. 323, March 1939.

provided for a judgment by the enumerator concerning the condition of the elements of a house, each element to be rated as "good," "fair," or "poor." The rating reflected local attitudes and the judgment was given by a local person, hence: "It is probably safe to say that the conditions reported for all counties represent the standards of those counties."[3]

In 1944, Ellickson and Brewster of BAE, with the assistance of the Bureau of the Census, matched about 7,000 schedules from the Census of Agriculture with the Census of Population and Housing.[4] They thereby learned the number of rooms and the value of the house as reported by each farmer. These items alone provided the criteria for a classification of houses by groups called "acceptable," "passable," and "unacceptable."

Hartmans undertook to test these criteria against objective tests of structural level and condition obtained from his survey data in Michigan.[5] Average results from these methods appear to be similar, but considerable deviation, especially between the two lower classes, is evident in individual cases.

Besides these statistical studies, the Department has issued at least two publications concerning housing standards.[6] Rather than providing a measure of conditions, those publications suggest value judgments of specialists concerning what they believe people ought to want in farmhouses. In neither of the publications are structural standards the focus of interest. Emphasis is placed on the amount and arrangement of space, orientation, facilities, and similar functional aspects. Various college publications have been of somewhat similar import.

Census

In 1940 and subsequently, several reports of the Bureau of the Census classified houses in two groups: "In need of major repairs" and "Not in need of major repairs." In some instances the enumerator took the word of the occupant; in others he rendered his own judgment. In neither case was there uniformity in application of standards. Nor was structural level adequately reflected in the classification. A shack might need no major repairs and thus be classified as "Not in need of major repairs." But it might need replacement by a building of more adequate construction; this need was not covered by the Census report. Despite these limitations, the Census classification has served many uses for a decade.

In 1950, Census of Housing made a different approach. It recognized structural level as well as condition.[7] Enumerators were given a set of carefully drafted instructions with pictures, and a brief training of perhaps half an hour, including a training film plus field supervision, so they would use uniform methods of classification. As the pictures are believed to be an especially useful device for obtaining uniformity in application of standards, the results are believed to be generally reliable. Two classes were offered: "Dilapidated" and "not dilapidated."[8]

A house might be rated as dilapidated if (1) it had any "critical deficiency" (of condition), (2) it had enough "minor deficiencies" so "that the dwelling does not provide adequate shelter or protection against the elements or is physically unsafe," or (3) it was of "inadequate original construction" (structural level) such as makeshift walls, dirt floors, and cellars, etc., which have been inadequately converted for living quarters. Although in the opinion of the writer, the mere compounding of minor deficiencies is not equivalent in importance to the presence of any one major de-

---

[3] Ibid., p. 38.

[4] The sample was about one-tenth of 1 percent. See "The Farm Housing Problem," submitted to Senate Special Committee on Postwar Economic Policy and Planning, January 17, 1945.

[5] HARTMANS, ERMOND. SOME ECONOMIC AND PHYSICAL ASPECTS OF FARM HOUSING AND SERVICE BUILDINGS IN SELECTED AREAS OF MICHIGAN. Thesis (Ph. D.), Michigan State College, 1950.

[6] WILSON, MAUD. HOUSING REQUIREMENTS OF FARM FAMILIES IN THE UNITED STATES. U. S. Dept. Agr. Misc. Pub. 322, February 1939; MINIMUM REQUIREMENTS FOR FARMHOUSES, U. S. Dept. Agr. Misc. Pub. 475. October 1941.

[7] A statement of this distinction may be found in "General Instructions to Enumerators" for a project on "Economics of Farm Service Buildings," Ill. Agr. Expt. Sta. and U. S. Dept. of Agr. Cooperating, 1949. This material was available to both the Census and BAE when preparations were made for the 1950 enumeration and survey. To Dean Carter of the University of Illinois and Wallace Ashby of the U. S. Dept. of Agr. and the Federal Inter-Agency Committee on Housing Adequacy go much of the credit for developing a clear distinction between structural level and condition.

[8] UNITED STATES BUREAU OF THE CENSUS. ENUMERATOR'S REFERENCE MANUAL. 1950 Census of the United States, par. 321, p. 84.

ficiency,[9] yet such minor deficiencies often are symptomatic of other faults. Where observation is difficult as in the case of row houses and apartments, the use of these indicators may be the only practical procedure.

Every effort was made to achieve uniformity in application of standards; the enumerator made the final judgment concerning quality of housing. The enumerator had to carry a set of detailed instructions with him and in his mind, and had to make a spot judgment concerning whether or not a house was dilapidated. The Census schedule would have been much too long had it included the descriptive detail on which judgment was based.

American Public Health Association

The Committee on Hygiene of Housing of the American Public Health Association has developed the most detailed procedure for rating houses that is known to the writer.[10] This committee has directed intensive surveys of city-slum areas at the behest of local authorities. Enumerators are intensively trained, are closely supervised, and are required to report in much detail. Obviously the procedures are inapplicable to less intensive and less expensive types of survey.

Objectives and Problems in Development of 1950 BAE Schedule

Even before passage of the Housing Act of 1949 the BAE had undertaken preliminary development of a technique that, it was hoped, could be used by workers who are not engineers in reporting structural level and condition of farmhouses. The aspect of national defense had not then become paramount. The broad objective was to inventory the characteristics of farm housing as a guide to public and private policy and action. Several subordinate objectives governed the design of the specific technique:

1. To obtain an objective description of structural character and condition.
2. To obtain uniformity in reporting the description, yet to allow for differences in climatic conditions.
3. To design a schedule that could be used, after brief training, by a person without engineering or architectural training.
4. To classify houses by different grades according to structural level or condition, or both—this classification would not be made by field personnel but according to uniform procedures established for tabulating purposes.
5. To be able to relate these grades of structural level or condition to other variables such as composition and size of family, income, type of farm, and presence of modern household facilities.
6. To utilize the results for interpreting the 1950 Census of Population and Housing and Agriculture.

Development of 1950 Schedule

The problem in the development of the 1950 schedule, in both point of time and importance, proved to be that of clearly distinguishing "structural level" from "condition."

The second major problem was to design a system of reporting that a layman could use. Were a Nation-wide survey to be undertaken, it would necessarily be by the same people or the same type of people that make surveys of crop production, farm income, livestock numbers, or other strictly agricultural subjects. These enumerators are farmers, housewives, farmers' daughters, retired professional men, and others who work on call for a few weeks for any given survey. Rarely are these individuals trained in engineering or in architecture. Many have built or repaired farm buildings; many have not. Moreover, only a few hours of training on this specialized aspect of the housing survey could be given. Then too, not more than 10 or 15 minutes of the enumerator's time on each interview could be devoted to recording the structural character and condition of the house.

These considerations bespoke simplicity in design of the schedule. The solution lay in the development of a set of multiple-choice phrases that could be used to describe most individual farmhouses. The enumerator had only to choose the pertinent description for each element of structural character and condition. To save time, the description was limited to the exterior of the structure. Experience indicated that for the great bulk of detached frame dwellings the exterior view was sufficient.

---

[9] For a view expressed by Samuel J. Dennis supporting the Census approach see STANDARDS FOR MEASURING HOUSING NEEDS, Report of the Special Committee to Study Problems of Small Business, Senate Com. Print No. 8, 79th Cong., 2d Sess., p. 5. See also BEYER, GLEN H. HOUSING AND JOURNEY TO WORK. N. Y. (Cornell) Agr. Expt. Sta. Bul. 877, Aug. 1951, in which major and minor deficiencies were combined variously to provide a threefold classification, "good," "fair," and "poor."

[10] AN APPRAISAL METHOD FOR MEASURING THE QUALITY OF HOUSING, Part I, 1945; Part II, Vols. A, B, and C, 1946, American Public Health Association.

The final schedule that was used in this survey of farmhouses and farm construction has space for reporting such items as number of rooms and facilities in each house, number of occupants of each house, amount of farm and family income, tenure of operator, and 1949 expenditures on construction. For the Northern States only, data also were taken on the use of building material. Finally, Part H of the schedule pertained to structural level and condition (Exhibit I). This paper is concerned with Part H.

Part H can be used for two principal purposes: (1) Descriptive classification of the characteristics of the various elements of a structure and (2) evaluative classification of houses by structural level and condition. Tabulation for the purposes of description will give a myriad of detail. Tabulation into evaluative classes will reduce the detail but will inject some value judgments.

Evaluative Classification

Houses as descriptively reported by field enumerators were coded and tabulated into three classes with respect to structural level and condition: "low," "intermediate," and "high." Structural level, if wanted, can be tabulated separately from condition, though in practice as an economy measure the two have been combined to provide a single rating. Whether or not a house with a "low" rating is considered "unsatisfactory" for human occupancy is a value judgment beyond the scope of this article.

PREMISE.—The premise for the particular classification used in this survey was that the most defective element of a structure, say the foundation, determined the rating of the entire structure. A serious deficiency caused a house to be rated low, whereas an intermediate deficiency, in the absence of greater defects, gave a house an intermediate rating. Deficiencies were considered individually. Since in the case of farmhouses major deficiencies usually can be observed, a cumulation of small deficiencies was not regarded as equivalent to a major deficiency. Moreover, even if not fully observed, other important deficiencies are commonly associated with any major deficiency. Hence, a rating of an element not only is important for that element but it may also serve as an index of associated conditions that may not be specifically reported.

In Exhibit I the letters at the right of each element of a structure show the highest rating obtainable by a structure having the characteristics described at the left. These ratings did not appear on the schedules that were used by the enumerators but were added in the final editing process. "H" stands for high, "I" for intermediate, and "L" for low. For example, if a foundation were so deficient as to be reported as "C, 1, a," then even though the other elements of the house were less deteriorated, the house as a whole would be given a final rating of low. The assignment of actual ratings for the purpose of tabulation also required decisions as to combinations of types of conditions all in the same element of individual houses. In general, the most defective aspect governed, unless it applied to only a small part of an element, say an old foundation under a small back room of an otherwise comparatively sound house. Many problems arise in attempting to obtain objective reporting. Much depends upon the details of the schedule. Comments that follow concern some of the detailed aspects of the schedule and their use.

Comments on Details of Reporting

"H-1" relates solely to the *type of construction.* "Structural type," "size," and "weather-tightness" are described. Many frame houses have a masonry veneer siding. If an enumerator could not be certain as to the type of construction, he was encouraged to ask the occupant whether the structure were of solid masonry or of veneer.

The size of a house has a bearing on its structural character. It is possible to live comfortably in very small space, yet there is some level below which any family life is scarcely adequate. Moreover, very small houses are usually deficient in other respects. Size is partly an index of structural level as well as a component. How small may a house be? A publication of the Department states that "where living, dining, and kitchen space are all provided in one room the space should be not less than 300 square feet."[11] Yet some smaller houses offer comfortable living quarters to small families. Size must be related to number of occupants; even a very large house may be overcrowded. But intensity of use is not an element of structural level or condition.

The schedule provides for a report on houses of three size classes: (1) Under 200 square feet; (2) 200-299 square feet; and (3) 300 or more square

[11] MINIMUM STANDARDS FOR FARM HOUSES. U. S. Dept. Agr. Misc. Pub. 475, 1941, p. 4.

feet. Two hundred square feet of floor space was arbitrarily assumed to be the level below which a house is of low structural level. Hence no other descriptive detail of Section H was taken for such houses. It was assumed arbitrarily that houses between 200 and 299 square feet, if otherwise satisfactory, were not higher than the intermediate level and that houses of 300 or more square feet, if otherwise satisfactory, were of high structural level.

Weather-tightness is an important element in adjusting housing standards to prevailing climate. People in Wyoming contend that a "house with a keyhole is not weather-tight." People in tropical climes even resist the presence of screens "because," they say, "it reduces the circulation of air." The instruction to enumerators in this survey was to use their personal knowledge of a locality in judging whether the houses under observation were sufficiently weather-tight to meet local climatic conditions. Whether the foundation was sufficiently tight to meet local conditions was covered in the H—2 part of the schedule. Because this part of the schedule required judgment, it is less objective than most aspects of the schedule.

The H—2 part of Section H covers the *foundation*. Here structural level as well as condition is involved. A house without a foundation was presumed to be of low structural level. A house with wooden posts was presumed to have a possibility of being of an intermediate level, though not of a high level. Houses with piers laid without mortar were considered as not more than intermediate but if mortar had been used it was possible for such foundations to be rated of high structural level. A continuous foundation without mortar was considered intermediate in character.

Whether posts or piers are "curtained" to keep out cold weather is important only where cold weather is common. If a house located in the North lacked curtains between piers, it was considered to be of not more than an intermediate structural level. In the South such a house would be entirely satisfactory in this respect.

The "condition of foundation" was set up in such a way that the enumerator needed to check only one descriptive phrase. In general, the descriptive phrases were arrayed from worst to best. The degree of settling was not used in the final rating because the enumerators were unable to report this characteristic with consistency.

The part H-3 on *"floor types"* proved unsatisfactory in field use because the enumerator frequently could not see the character of the floor. This part of the schedule was not tabulated.

Part H-4 concerning *"outside walls"* classifies houses as having either "masonry" or "other" siding. Masonry siding may be found on many frame structures. Masonry siding was presumed to be of a high character unless it was not in good condition. "A-1" provides a choice of four possible descriptions of the condition of a masonry siding. Like the rating of the foundation, this part required judgment by the enumerator but it is believed that enumerators would rarely be more than one grade apart on such judgments.

The other siding, part "B," is divided into "1, Material" and "2, Condition." Tar-paper siding was considered to be of low structural level, but wood or composition siding could be of high level.

The condition of other siding is rather easily observed. Some enumerators, however, had a little difficulty in ascertaining whether as much as one-fourth of a side was "missing, rotten, loose, or badly warped." This difficulty was overcome with a little field training.

The condition of *windows* and *doors* is reported in H-5. In making the tabulations, this factor alone was not permitted to cause a rating of less than intermediate. Another part of the schedule, E-12, contains an inquiry as to whether every room has a window. Ideally, this element would be used in the rating but as an economy of editing time, it was not. Whether glass was actually in place did not influence the rating, because replacement could be easily made.

H-6, relative to *paint*, was introduced as a matter of information and to discover what relation, if any, existed between condition of paint and condition of the structure. It was not used to rate the structural level or condition of a structure.

The observations the enumerator made of the *roof*, H-7, are divided into three parts: "Material," "Condition of covering," and "Condition of roof structure." As to material, a tar-paper roof was rated as of low structural level. When other listed materials were used the roofs, if otherwise satisfactory, were rated of high structural level. The condition of the covering of the roof was reported as it appeared from a ground view. Enumerators had considerable difficulty in answering the question in accordance with uniform standards, so the condition of the roof covering did not enter the final

rating. As to the roof structure, a small sag of pole or roof area—not sufficient to displace surface materials—was allowed in a roof that was rated as high in condition, for many roofs have a slight sag in the ridge pole or the roof area and yet are essentially sound and may last many years. But if a sag was sufficient to displace surface materials, the roof was rated as being of low condition.

Chimneys, H-8, caused some difficulties in accuracy of reporting. The main consideration was the possibility of fire hazards. All hazardous conditions could not be observed from the exterior of a house—only the more glaring ones. A cracked, crumbling, seriously rusted or precariously leaning chimney was unsafe and in the final tabulations was given a low rating. The type of material and distance of a chimney opening from roof or siding were not used in making the final ratings.

Porches, H-9, were considered from the viewpoint of their support to the roof of the house proper and their effect on the safety of persons. If a roof of a porch were a continuation of the roof of the house proper, then it would be important whether the pillars and connecting supports were or were not so rotted, loose, or damaged as to endanger support. If this were the case, a porch alone gave a house an intermediate, though not a low, rating. If floor boards seriously endangered persons, this condition gave an intermediate, though not a low, rating to a house.

Steps, H-10, and *Other attachments,* H-11, were considered solely from the viewpoint of the safety of persons. Conditions constituting real hazards to life or limb were regarded as warranting the rating of a house in an intermediate category.

ENUMERATOR ONLY REPORTED.—The field *enumerator merely reported* what he saw. He did not make a final rating of a structure. Once the descriptions are in hand, the final ratings can be made according to various standards. The ratings made by BAE for the purpose of preparing a tabulation are based on consultation with several housing specialists. Standards of floor area used by BAE are often criticized. It is contended that houses should have more floor area than the 300 square feet required for high rating. But probably, two persons, with one child, can meet basic physiological needs and simple social requirements in such space.

The description of structural level and condition was *limited to the exterior* of structures. This saved much time and avoided the possibility of irritating the occupants by entering the houses. As farmhouses are mostly detached frame structures, the results of outside observation were adequate. Obviously this kind of observation is not applicable to row houses or apartment houses. The system may tend to overrate houses that have masonry exteriors, but farmhouses are rarely of this type.

Training and Sampling

Before enumerators were sent out on the Housing Survey they were given a carefully prepared set of instructions, usually 3 days of training, and some field supervision. From 2 to 4 hours were devoted to the training for Part H, concerning structural character and condition. Enumerators were given field experience in reporting on a variety of types of detached houses. Usually some of the field training was given in a section of a city that offered examples of most common defects for which enumerators were instructed to watch.

The farms sampled in the survey were those found in a set of small areas chosen at random, or segments, drawn to represent all parts of the country. The survey covered about 16,000 farms in 382 primary sampling units (usually counties), drawn from a geographic type-of-farming area stratification. Data on new construction of houses are based on all farms surveyed, but data on housing characteristics were obtained on only a subsample of about 6,000 farms. Of 3,228 segments drawn for the survey, 5 could not be visited because of bad weather. In the remaining segments, interviews were obtained from 96 percent of the farms classified as eligible for the sample.

Quality Check, Suggested Improvements, Further Research

Several questions now suggest themselves. How successful from a statistical standpoint was the survey? What further improvements in technique are suggested? What additional research is proposed? The answer to the first question called for a "quality check."

Quality Check

Following the survey in the Southern States a check of the quality of enumerators' reports was made in 127 of the segments included in the survey. With respect to Part H concerning structural character and condition, the sample included only 88 houses. This number, in the opinion of statis-

TABLE 1.—*Comparison of results of enumeration in February Survey with quality test on 88 cases*

Item			Cases of agreement	Cases of disagreement	Cases of noncompensating differences
H-1	A	Type of construction	82	6	6
	B	Size	86	2	0
	C	Weather-tightness	79	9	5
H-2	A&B	Type of foundation	40	48	13
	C	Condition of foundation			
		Including subject of settling	37	51	17
		Excluding subject of settling	45	43	(1)
H-3		Floor types	77	11	11
H-4		Condition and type of outside walls			
		Type and material	78	10	4
		Condition	46	42	6
H-5		Windows and doors	49	39	12
H-6		Paint	59	29	5
H-7	A	Roof—material	76	12	8
	B	Roof—condition of covering	42	46	15
	C	Roof—condition of structure	57	31	8
H-8	A	Chimney—material	73	15	8
	B	Chimney—distance to opening	75	13	5
	C	Chimney—condition	52	36	7
H-9		Porches—type	54	34	8
		Porches—condition	69	19	4
H-10		Steps	62	26	7
H-11		Other attachments	65	23	10
		Average of groups of judgments	62	26	8

[1] Inapplicable.

ticians of the Bureau, is adequate for checking the extent to which the system of reporting can be used consistently.

Each enumerator and quality checker was required to make 21 groups of judgments concerning the structural character and condition of each of the 88 houses covered by this phase of the quality check. The quality checkers completely agreed with the enumerators' judgments on 62 cases or 70 percent of the individual decisions; they disagreed on 26 cases or 30 percent. However, most of the differences were compensating in character, so that the final results in the rating, say of 88 foundations or of 88 side walls, were at variance in only 9 percent of the cases. Not only this, but most differences in judgment were of small degree; only about 9 percent were disagreements of as much as 2 or more grades of structural character or condition. The enumerator and checker could agree by the wrong standards, but the training and instructions tended to avoid this possibility.

There were more agreements in reporting on some items than on others (table 1). The extent of disagreement as to whether a foundation was settled was so much that the question of settling, except as it influenced other conditions, was not used in making the final ratings. Besides the question of settling, the ratings of foundations still were in considerable disagreement. Differences in judgment of 2 or more grades occurred in 12 of the 88 cases (table 2). In any future surveys, special attention must be given to training enumerators to describe deficiencies in the foundation. The extent of disagreement on this item should be reduced.

There was also marked disagreement as to the condition of the covering of a roof. Disagreement of 2 or more grades on the condition of roof covering was found in 16 of 88 cases—a figure so high as to bring into question the validity of the judgments on roof covering. Hence, the roof covering was not used in the preparation of the final rating in the 1950 survey.

Some Suggestions

The reporting of structural level and condition, though subject to faults, was accomplished with an acceptable degree of success in the 1950 survey. But the need for reporting does not end with one survey. Other surveys will follow in years to come. Certain lessons can be drawn from the recent experience:

1. Emphasis should be given to training enumerators to distinguish various degrees of deficiency in foundations and roof covering. Training slides and pictures carried by the enumerator, as used by the Census, might help.
2. Not less than 3 hours of field training should

TABLE 2.—*Of 88 cases, the number with differences of two or more grades of condition*

Items for which at least 4 grades were offered	Number of cases of large disagreement
Condition of foundation (settling excluded)	12
Condition of walls	7
Condition of roof covering	16
Condition of chimney	8
Average of 4 items	10
Items for which only 3 grades were offered	
Condition of windows and doors	3
Condition of roof structure	1
Average of all 6 items	8

be devoted to the reporting of structural level and condition.

3. The basis for classifying houses according to structural level and condition should be considered more fully and perhaps modified by architects and engineers from whom expert judgments may be expected.

4. If reference is made in future schedules to protective thimbles on metal chimneys provision should be made for a record of the kind of fuel used—solid, liquid, or gaseous. The last two types can be used safely under certain conditions that are unsuited to the use of solid fuels.

5. Height of floor above ground level and condition of paint may be omitted from the schedule.

6. Consideration might be given to omission of the reporting on porches, steps, and other attachments. Safety conditions are readily ascertained from these items, but they are less important than the basic parts of a structure.

7. For the benefit of enumerators, the following parts of the schedule require simplifications: Type of foundation, chimney, porches, and other attachments.

8. A question as to value of the farmhouse and the service buildings should be added, using the approach Hartmans made in the Michigan study.

Suggested Matching With Census Schedules

This BAE survey of 1950 covers too small a sample to provide more than national and regional data. Yet data for States and smaller areas are greatly needed. Action agencies like the Farmers Home Administration and the Extension Service require these data in order that they may plan their programs in accordance with the housing needs of the farm population. Marketing quotas of private industry must relate to area potentials.

The Censuses of Agriculture and of Population and Housing offer a wealth of useful detail. The matching on a sample basis of the three Census schedules obtained for each farm would throw light on important interrelationships between farms, houses, and people. Further information could be gleaned from the Census, and the BAE survey could be made more useful if the Census schedules also were matched with the BAE schedules. At least two purposes would be served:

1. A summary description in BAE terms of the farmhouses classified by the Census as dilapidated and not dilapidated would become available, and by extension the data might be applied to States and economic areas.

2. More detailed relationships between housing, population, and income would be made available than can be obtained from Census and BAE data taken separately. If extended to States or smaller areas, these relationships would enable action agencies to plan programs in accordance with need.

Concerning Wartime Uses of Rating System

In the unhappy event that the civilian population must be moved away from industrial areas during an emergency, rural shelter will be greatly in demand. A quick method of recording the quality of houses (and even of farm service buildings) might be needed. The BAE's schedule can be adapted to such use. Within a few hours enumerators could be trained to report on structural level and condition, as well as on facilities, intensity of existing uses, and other items. The BAE schedule is available whenever it may be needed, for either peacetime or emergency uses.

Exhibit I

H. STRUCTURAL CHARACTER, MATERIALS, AND STATE OF REPAIR

(If you *can see, do not ask respondent*)
(Highest rating attainable (H, I, L) for a given characteristic is as indicated to right of each item.)[1]

H—1. Type of construction — living quarters only:

A. Structural type (check one):

1. Frame (including masonry veneer)	( )	H
2. Solid masonry	( )	H
3. Log without framing	( )	I
4. Other ———— Specify	( )	
5. Do not know	( )	K

B. Size (check one):

1. Under 200 sq. ft. (If under 200, skip to page 24 and enter time completed)	( )	L
2. 200 — 299 sq. ft.	( )	I
3. 300 or more sq. ft.	( )	H

C. Weather-tightness (check one):

1. Adequately weather-tight against local climate	( )	H
2. Not adequately weather-tight against local climate	( )	L

[1] These *ratings were not on the field schedule* and were applied only in the editing and coding process.

H—2. Foundation — (*only that under living quarters* and porch pillars that support a continuation of the roof of the house proper.)

A. No foundation present (except possibly skids or logs laid horizontally on ground ( ) L

B. Foundation by type:

1. Wooden posts:
   a. No curtain — or else open type curtain between posts ( ) I or L[2]
   b. Weather-tight curtain —between posts ( ) I
2. Masonry piers:
   a. Protection:
      (1) No curtain—or else open type curtain between piers ( ) H or I[3]
      (2) Weather-tight curtain—between piers ( ) H
   b. Binding:
      (1) Piers laid without mortar ( ) L
      (2) Piers laid with mortar ( ) H
3. Continuous foundation:
   a. Laid without mortar ( ) I
   b. Laid with mortar ( ) H
4. Cannot see material of foundation ( ) X

H—3. Floor types—living quarters only (check one):

A. Earth only ( )

B. Floor less than 6 inches from ground:

1. Concrete, tile, stone, or other masonry material ( )
2. Wood ( ) Not used in Rating
3. Cannot see type of material ( )

C. Floor 6 inches or more above ground in three-fourths or more of area ( )

H—4. Outside walls (living quarters only):

A. Masonry (brick, stone, stucco, and similar material)
(If not masonry, skip to B):

1. Condition of masonry walls (check one):
   a. Open cracks, pieces falling out, mortar crumbling, or wall bulging sufficiently to *endanger permanence* of structure ( ) L
   b. General or major deterioration evident—but *does not seem to endanger permanence* of structure ( ) I
   c. Check cracks, missing mortar, and other *minor faults* — require only minor repairs ( ) H
   d. No noticeable defects ( ) H

B. Other siding (check one or more if present):

1. *Material:*
   a. Wood ( ) H
   b. Composition (asphalt shingles or roll asbestos —cement, etc.) ( ) H
   c. Tar paper (tears like any heavy paper) ( ) L
   d. Other material———— Specify ( )
2. Condition of other siding (check one, if applicable):
   a. Missing, rotten, loose, or badly warped siding including trim — covering *more than one-fourth of any side* ( ) L
   b. Missing, rotten, loose, or badly warped siding including trim—covering *less* than one-fourth of any side ( ) I
   c. Some deterioration—re-

[2] Intermediate except that in the following States the rating will be low: New England, New York, New Jersey, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Iowa, Nebraska, Wisconsin, Minnesota, North Dakota, South Dakota, Missouri, Kansas, Colorado, Wyoming, Montana, Idaho, Oregon, Washington.

[3] High except that in States listed in footnote 2 the rating will be intermediate.

quires *only* maintenance repairs ( ) H

d. No noticeable defects ( ) H

H—5. Windows and doors—living quarters only—including sash, frames, and sills (check one):

A. Any parts missing, dislodged, seriously rotted — enough to need replacement or major repairs (exclude glass and screen) ( ) I

B. Some deterioration — require minor repairs such as puttying, caulking, replacing glass or screen, and fastening loose parts ( ) H

C. No noticeable defects ( ) H

H—6. Paint — of siding, windows, and doors of house proper (check one):

A. Never painted ( )

B. Painted at some time — Not used in Rating

1. Seriously weathered, cracked, or blistered *over one-fourth or more of any side* ( )
2. Shows some weathering ( )
3. No noticeable defects ( )

C. Condition of foundation (check only one item under condition *selecting the worst aspect you see.* If more than one type of foundation is present, *rate inferior type only*)

1. Settling evident:
   a. Breakage, looseness, or rot of *one-fourth or more* of foundation — enough to require replacement or resetting — to prevent further settling ( ) L
   b. Breakage, looseness, or rot of *less than* one-fourth of foundation — enough to require replacement, resetting, or *major* repairs ( ) I
   c. Some small check cracks, rot, or other *minor faults* — requiring only *minor* repairs, if any ( ) H
   d. Cannot see condition of foundation ( ) X
2. No evident settling:
   a. Breakage, looseness, or rot of *one-fourth or* more — enough to require replacement or resetting—to prevent future settling ( ) L
   b. Breakage, looseness, or rot of *less than one-fourth*—enough to require replacement or resetting or major repairs — to prevent future settling ( ) I
   c. Some small check cracks, rot, or other minor faults—requiring only *minor repairs* ( ) H
   d. No noticeable defects ( ) H
   e. Cannot see condition of foundation ( ) X

H—7. Roof (*only that over living quarters and over porch pillars that support a continuation of the roof of the house proper*):

A. Material (check one):

1. Tar paper ( ) L
2. Pour tar ( ) H
3. Metal ( ) H
4. Asphalt shingles or roll ( ) H
5. Wood shingles ( ) H
6. Tile or slate ( ) H
7. Other ———— ( )

Specify

B. Condition of covering (check one):

1. Holes, leaks, rotted or seriously loose roof material obvious from outside ( )

2. Materials somewhat curled or loosened ( ) Not used in Rating
3. Minor deterioration ( )
4. No noticeable defects ( )
5. Cannot see condition of roof covering ( )

C. Condition of roof structure (check one):
1. Ridge pole or roof area sags—so much—as to *force surface material out of place* ( ) L
2. Some sag of pole area—*not sufficient to displace* surface materials ( ) H
3. No noticeable defects ( ) H
4. Cannot see condition of roof structure ( ) X

H—8. Chimneys on house or its attachments (check A or one item *each* of B, C, D):
A. No chimneys (If none—skip to H—9) ( )
B. Material:
1. Metal:
(a) Without protective thimble ( ) Not used in Rating
(b) With protective thimble ( )
2. Masonry ( )
3. Other ———— ( )
Specify

C. Distance of any opening or hole from roof or siding:
1. Under 18 inches ( )
2. 18 inches or over ( ) Not used in Rating

D. Other conditions:
1. Masonry cracked or crumbling—seriously—or metal rusting—or leaning precariously ( ) L
2. Pointing (putting in mortar) or other minor maintenance needed ( ) H
3. No noticeable defects ( ) H

H—9. Porches—not living quarters (check A or one item of B and one of C):
A. No porches (If none, skip to H—10) ( ) H
B Porch type: ( ) H
1. Without roof.
2. With roof:
a. Porch roof not continuation of roof of house proper ( ) H
b. Porch roof continuation of roof of house proper:
(1) Pillars and connecting supports rotted, loose or damaged—so that support of roof of main structure is endangered ( ) I
(2) Pillars and connecting supports somewhat deteriorated — but roof support not endangered ( ) H
(3) No noticeable defects ( ) H

C. Porch condition (check one if applicable):
1. Hazardous to life or limb ( ) I
2. No noticeable hazards ( ) H

H—10. Steps (outside of house and porches) (check one):
A. No steps ( ) H
B. Steps that are:
1. Hazardous to life or limb ( ) I
2. No noticeable hazards ( ) H

H—11. Other attachments (check one):
A. No other attachments ( ) H
B. Other attachments:
1. Hazardous to life or limb ( ) I
2. No noticeable hazard ( ) H

Time completed————

Factors Affecting the Domestic Mill Consumption of Cotton

By Frank Lowenstein

Analyses of fluctuations in cotton consumption based on pre-1940 data must be modified in the light of recent experience. In particular, rayon has now become a highly important and measurable influence on the consumption of cotton by domestic mills. This article presents estimates of the effects on cotton consumption of cotton prices, rayon consumption, and industrial activity, during the years 1921 to 1940 and 1947 to 1950. The paper also considers problems of measuring and forecasting the growth of rayon consumption itself. (Research for this article was made under authority of the Research and Marketing Act of 1946.)

MILL CONSUMPTION of cotton in the United States since 1921 has varied widely from year to year. These variations and their causes have long been of concern to growers, manufacturers, and others who are directly or indirectly associated with cotton and cotton textiles. In peacetime years since 1921, mill consumption has ranged between 2,601 million pounds in 1921 and 4,685 million in 1950 (table 1). Obviously, strong forces in the economy of the United States have caused these large variations. It is the major purpose of this report to identify the principal causes and to measure their effects.

As a consequence of the development of additional information and of the growth of synthetic fiber consumption, earlier studies[1] which analyzed factors affecting the consumption of cotton are no longer adequate. The most recent study included data only through 1938, and none of the earlier analyses applied measurements of the effect of the consumption of synthetic fibers. This paper extends the analysis to the years following World War II, incorporates some additional data now available, and analyzes the effect of synthetic fiber consumption.

[1] See SMITH, BRADFORD B. FACTORS AFFECTING THE PRICE OF COTTON. U. S. Dept. Agr., Tech. Bul. 50, January 1928; COX, ALONZO B., COTTON PRICES AND MARKETS. U. S. Dept. Agr., Dept. Bul. 1444, December 1926; HOWELL, L. D. COTTON PRICE RELATIONSHIPS AND OUTLETS FOR AMERICAN COTTON. U. S. Dept. Agr. Tech. Bul. 755, January 1941; SCHULTZ, HENRY. THE THEORY AND MEASUREMENT OF DEMAND. The University of Chicago Press, Chicago, Ill., 1938, Chapter VIII; BEAN, L. H. A SIMPLIFIED METHOD OF GRAPHIC CORRELATION. Amer. Statis. Assoc. Jour., December 1929, page 396.

How Demand for Cotton Consumption Is Ascertained

Cotton used by domestic mills to manufacture fabrics and end products is called "mill consumption of cotton." As the United States exports only small quantities of cotton fabrics and end products, the mill consumption in this country depends upon the domestic demand by industry and by ultimate consumers for end products made from cotton. This demand is determined by the number of people who use cotton products, the level of consumer income and industrial activity, the availability of substitute fibers, and the price of cotton as reflected in cotton products.

POPULATION.—In the period covered by this analysis—1921 to 1950—the population of the United States increased from 109.3 to 152.6 million persons (table 1). As each new individual creates eventual demand for virtually all products, this increase in population would tend to cause increases in cotton consumption, in industrial activity, and in consumption of substitute fibers. To remove intercorrelation caused by this common growth factor, all three series are expressed in per capita terms.

INDUSTRIAL PRODUCTION—In price and consumption analyses of food products, consumer income—"disposable personal income"—is often used to represent changes in the general level of demand.[2]

[2] FOX, KARL A. FACTORS AFFECTING FARM INCOME, FARM PRICES AND FOOD CONSUMPTION. Agricultural Economics Research, July 1951, Vol. III, No. 3, pp. 65-82.

TABLE 1.—*United States population, cotton consumption, rayon consumption, and cotton price, 1921 to 1950*

Year	Population U. S. July 1	Cotton mill consumption	Federal Reserve Board Index of Industrial Production	Rayon consumption	Price Middling 7/8 inch cotton July year	BLS wholesale price index July year	Deflated price Middling 7/8 inch cotton
	Millions	*1,000 lb.*	*1935-39=100*	*1,000 lb.*	*Cents per lb.*	*1926=100*	*Cents per lb.*
1921	109.3	2,600,580	58	19,751	19.03	124.2	15.32
1922	110.9	2,911,265	73	24,757	17.16	93.7	18.31
1923	112.7	3,122,571	88	32,558	25.54	101.2	25.24
1924	114.9	2,636,082	82	42,243	29.85	98.1	30.43
1925	116.6	3,074,038	90	58,277	24.63	100.5	24.51
1926	118.2	3,211,993	96	60,629	20.23	102.5	19.74
1927	119.8	3,587,931	95	100,055	14.45	97.0	14.90
1928	121.3	3,184,867	99	100,493	18.39	96.1	20.18
1929	122.6	3,422,823	110	133,401	18.92	96.2	19.67
1930	123.8	2,615,066	91	118,835	16.29	92.5	17.61
1931	124.8	2,653,343	75	158,955	9.91	79.0	12.54
1932	125.6	2,461,793	58	155,331	6.15	68.2	9.02
1933	126.3	3,047,910	69	217,303	6.74	62.9	10.72
1934	127.1	2,657,754	75	196,882	10.64	72.0	14.78
1935	128.0	2,754,253	87	259,017	12.39	78.0	15.88
1936	128.9	3,469,973	103	322,430	11.49	80.1	14.34
1937	129.6	3,645,452	113	304,715	12.76	84.5	15.10
1938	130.7	2,917,737	89	329,390	8.93	82.4	10.84
1939	131.7	3,628,580	109	458,711	8.66	77.2	11.22
1940	133.0	3,958,718	125	482,045	9.83	78.2	12.57
1941	134.2	5,191,471	162	591,837	10.36	80.8	12.82
1942	135.7	5,633,146	199	620,624	17.66	94.6	18.67
1943	137.6	5,270,634	239	656,066	19.13	101.5	18.85
1944	139.3	4,790,406	235	704,741	19.51	103.4	18.87
1945	140.8	4,515,338	203	770,000	20.54	104.9	19.58
1946	142.3	4,809,128	170	875,500	23.51	107.9	21.79
1947	145.0	4,665,560	187	987,900	32.98	139.4	23.66
1948	147.5	4,463,480	192	1,149,458	32.80	160.4	20.45
1949	150.0	3,839,127	176	992,000	30.09	162.0	18.57
1950	152.6	4,685,139	200	1,351,400	29.85	153.2	19.48

Consumption of cotton depends upon the demand for cotton products from many sources, indirectly as well as directly associated with demand by ultimate consumers. For example, the National Cotton Council of America[3] estimates that about one-third of a total of 7,964,330[4] bales of cotton were used for industrial purposes in 1950. These uses include such items as bags, machinery belts, cordage and twine, electrical insulation, fabrics, and yarn used in automobiles, and laundry equipment and supplies. On the other hand, items of apparel accounted for 37 percent, and household uses for 31 percent of the total consumption.

In view of the importance of industrial uses, consumer income alone is not an adequate measure of the demand for cotton. Even with respect to household and apparel uses, consumer demand expresses itself at the retail-store level and is felt at the fabrics-manufacturing level only after passing through several intermediate marketing steps. Consumer purchases of cotton products during a given year may be out of line with mill consumption of raw cotton because of changes in inventories at different levels of manufacture and distribution. Total inventories of cotton products on hand or in process are equivalent to a substantial part of a year's consumption. With retailers and wholesalers trying to anticipate consumer demand, and with mills and manufacturers trying to anticipate orders from distributors, large fluctuations in inventories occur. Complete explanation of mill consumption of cotton for household and apparel fabrics would require accurate data on inventories at several market levels and the fitting of demand curves for each major class of manufacturers and distributors, as well as for final consumers.

[3] COTTON COUNTS ITS CUSTOMERS, PRELIMINARY 1950, National Cotton Council of America, Memphis, Tenn., May 1951.

[4] This total does not include 1,923,920 bales for which no division by use was estimated.

Distribution channels for industrial fabrics are shorter. At any given time, the consumption of such fabrics is directly related to the output of the finished products in which, or with which, they are used. A full explanation of the demand for raw cotton in these uses would require an analysis of the demand for the finished products. This approach would give us a large number of chains of "technical coefficients," such as pounds of cotton per pound of tire-cord yarn; pounds of yarn per tire; average number of tires sold as standard equipment per new automobile produced; and average number of tires bought for replacement per registered automobile. Some of these chains end in final consumer demand, as for passenger automobiles; others end in military goods, or in items such as machinery belts, and bags which bear no simple relationship to consumer demand. In addition, fluctuations may appear in inventories at various levels in each chain, though perhaps not so large as those of household textiles and apparel.

Apparently none of the commonly used indicators of demand are fully satisfactory for measuring mill consumption of cotton. A combination of consumer income and certain components of the index of industrial production might be appropriate to represent final demand for cotton products. But the level of mill demand for raw cotton would depend also upon the anticipations and uncertainties which lead to fluctuations in inventories.

In the analysis reported in this paper, the demand indicator[5] used was industrial production per capita. The major cyclical swings in this series are associated with similar swings in consumer income. In addition, the industrial-production series appears to be more closely associated with mill consumption of cotton in some of its sharper year-to-year changes, including some that are thought to be caused by inventory changes. The closer association may result partly from technical relationships between cotton consumption and the output of cotton-using industrial products, partly from waves of optimism or pessimism which affect large segments of the business community at the same time.

[5] The Index of Industrial Production includes cotton consumption as one component. Elimination of the cotton component alters the index by less than 2 percent in all but 2 of the 24 years used in this analysis. Therefore, the statistical analysis is based on the published index.

During World War II special circumstances caused mill consumption of cotton to depart drastically from its usual peacetime relationship to total industrial production. Stockpiling of military textiles contributed to a sharp increase in mill consumption during 1941 and 1942. Industrial production in 1943-44 was swollen with shipbuilding, aircraft, and other war manufactures which used relatively little cotton. From 1942 to 1945 scarcities of labor available to cotton mills caused consumption to fall. In view of these abnormalities, the years 1941 through 1946 are excluded from the statistical analysis.

Substitute Fibers.—Rayon consumption is used here to represent the consumption of substitute fibers. Synthetic fibers other than rayon have been produced in substantial quantities only since the end of World War II. Even in 1950 rayon accounted for more than 90 percent of the production of all synthetic fibers.[6] Additional data on consumption of other synthetics would be unlikely to alter the relationship significantly, though it is possible, as time goes on, that the effects of these other fibers may assume measurable importance.

Consumption of rayon in the United States increased from 0.07 pounds per capita in 1915 to 8.85 pounds in 1950. The increase in its consumption has followed a well-defined trend (fig. 1). Over the 36-year period, a Gompertz curve appears to fit this trend rather closely. This suggests that rayon consumption has not reached the half-way mark on its rise toward an ultimate saturation point. In a forecast from a curve of this type the standard error is very large. Therefore we are not justified in extrapolating the trend in figure 1 very far into the future. Nevertheless, consumption of rayon increased more than 5 pounds per capita between 1940 and 1950 and a further substantial increase is indicated in the next decade.

One of the factors that caused this rapidly increasing trend may have been the relation of the price of rayon to the price of cotton. From 1928 to 1945 the price of rayon yarn and staple fiber declined rather steadily, while the price of comparable cotton yarn and raw cotton after 1931 showed an increasing trend. The price of rayon has increased since 1945, but the price of cotton and cotton yarn has increased even more. Rayon

[6] In 1950, 1,351 million pounds of rayon and 145 million pounds of other synthetic fibers were produced in the United States.

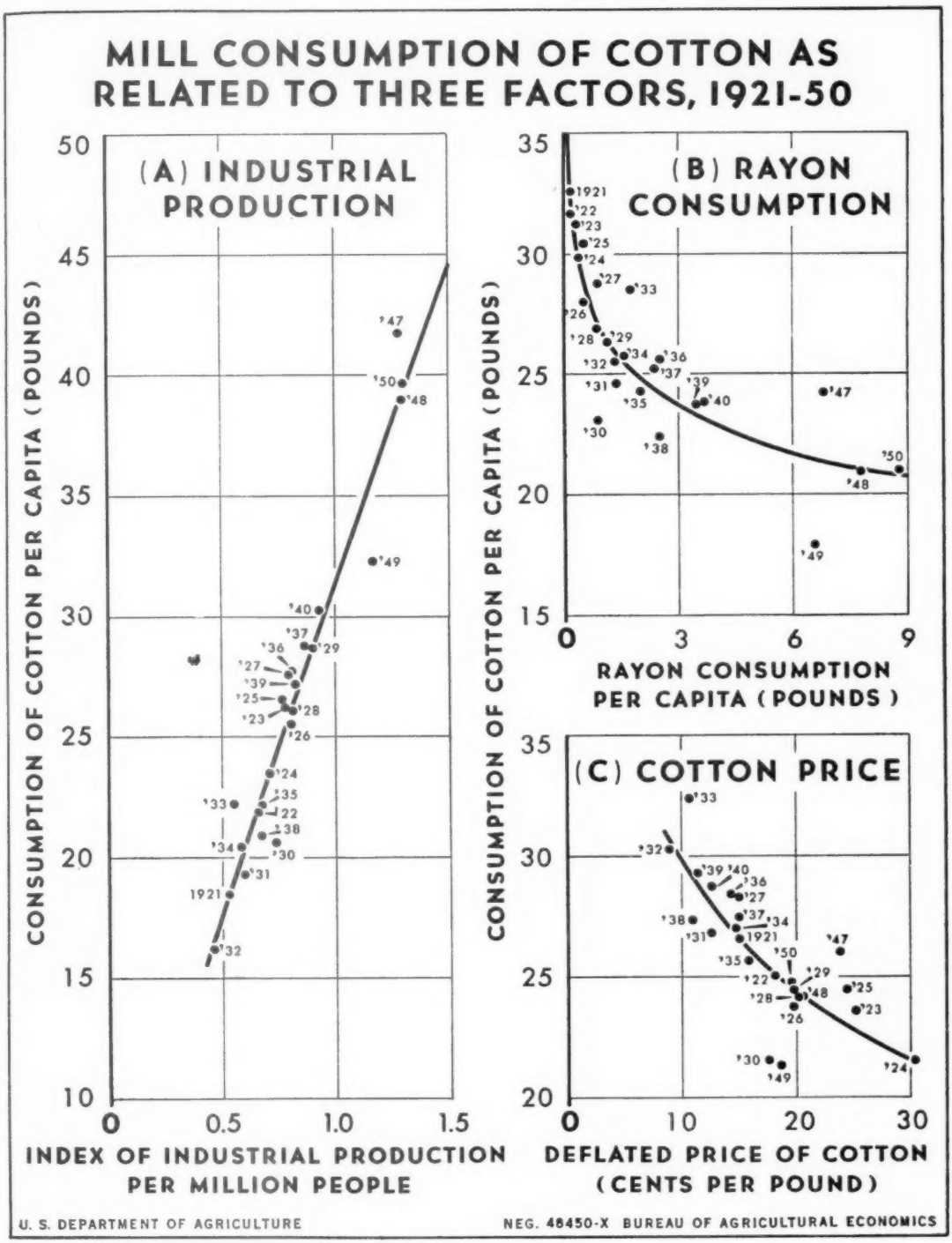
MILL CONSUMPTION OF COTTON AS RELATED TO THREE FACTORS, 1921-50
(A) INDUSTRIAL PRODUCTION
CONSUMPTION OF COTTON PER CAPITA (POUNDS)
INDEX OF INDUSTRIAL PRODUCTION PER MILLION PEOPLE
(B) RAYON CONSUMPTION
RAYON CONSUMPTION PER CAPITA (POUNDS)
(C) COTTON PRICE
DEFLATED PRICE OF COTTON (CENTS PER POUND)
U. S. DEPARTMENT OF AGRICULTURE
NEG. 48450-X BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 1.

has been cheaper than cotton and cotton yarn since 1943 (table 2 and fig. 2).

Assuming other factors constant—such as style preference, durability, and launderability — the price relationships between the two fibers would be an important element in governing the substitution of one for the other. As a matter of fact, rayon was substituted for cotton. Before the late 1930's the relation between the prices of the two fibers may have been a minor reason for this substitution. Rayon probably increased in use mainly because of style preference, one of the factors in promoting the consumption of rayon among women as recently as 1947.[7] Even though per capita consumption of rayon was vastly larger in 1937 than in 1915, it amounted to only about 8.4 percent of the per capita consumption of cotton, or 2.35 pounds. Since 1937, its consumption has increased to 28.8 percent of that of cotton, 8.85 pounds per capita in 1950. This striking increase coincided with sharp changes in the price relationship between the two fibers.

Improvement in the quality of rayon for particular uses has also promoted increased consumption. No satisfactory data are available to measure changes in quality, and no attempt is made here to analyze this development. However, there are a few indications of the effect of rayon's improvement in quality.

For example, before 1936 no rayon was used in tires for motor vehicles[8] and consumption of cotton in tires was the largest use for cotton in 1937 and

[7] UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. WOMEN'S PREFERENCES AMONG SELECTED TEXTILE PRODUCTS. U. S. Dept. Agr. Misc. Pub. 641, December 1947, Table 5, p. 11.

[8] UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. STATISTICS ON COTTON AND RELATED DATA. U. S. Dept. Agr. Statis. Bul. 99, June 1951, table 328, p. 391.

TABLE 2.—*Rayon and cotton: Actual prices of yarn and equivalent prices of raw fiber, United States, 1928 to date*

Year beginning August	Actual price per pound		Equivalent prices per pound of usable fiber			Ratios		
	Rayon filament yarn[1]	Cotton yarn[2]	Rayon staple fiber[3]	Cotton[4]		Rayon yarn to cotton yarn	Rayon staple fiber to Middling 15/16 inch	Rayon staple fiber to S. M. 1-1/16 inch
				Middling 15/16 inch	S. M. 1-1/16 inches			
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Percent*	*Percent*	*Percent*
1928	140	51	63.00	22.88	25.84	275	276	244
1929	114	49	63.00	19.81	22.53	235	320	279
1930	84	39	63.00	12.57	14.80	216	501	426
1931	72	29	54.60	7.89	9.75	245	692	560
1932	58	29	42.00	8.94	10.48	198	470	401
1933	63	47	38.85	13.50	15.40	134	288	252
1934	57	42	35.70	15.50	17.27	135	230	207
1935	57	40	34.65	14.82	16.50	142	234	210
1936	60	42	29.40	16.40	18.53	142	179	159
1937	57	34	26.25	11.65	13.27	170	225	198
1938	51	30	26.25	11.34	12.75	168	231	206
1939	53	35	26.25	12.66	13.68	152	207	192
1940	53	39	26.25	13.71	15.34	136	191	171
1941	55	50	26.25	22.33	25.01	110	118	105
1942	55	52	26.25	24.55	27.45	106	107	96
1943	55	52	25.20	25.07	27.97	106	101	90
1944	55	56	26.25	26.47	28.97	98	99	91
1945	55	62	26.25	31.26	33.15	89	84	79
1946	63	83	30.58	41.83	43.44	76	78	70
1947	71	102	36.33	41.39	44.87	70	88	81
1948	76	86	38.43	38.90	41.58	88	99	92
1949	71	81	36.75	38.55	42.42	88	95	87
1950	77	112	40.95	51.18	54.53	69	80	75

[1] Wholesale price of Viscose on skeins first-quality yarn, 150 denier until June 1947, since July 1947 "on cones."

[2] Wholesale price of Single 40's carded until July 1946, since August 1946, twisted carded.

[3] Wholesale price of Viscose, 1-½ denier. Assumes net waste multiplier of 1.05.

[4] Price of Memphis Territory growths, landed Group B mill points and assuming net waste multiplier of 1.15.

Compiled from data from Bureau of Labor Statistics and Cotton Branch, Production and Marketing Administration.

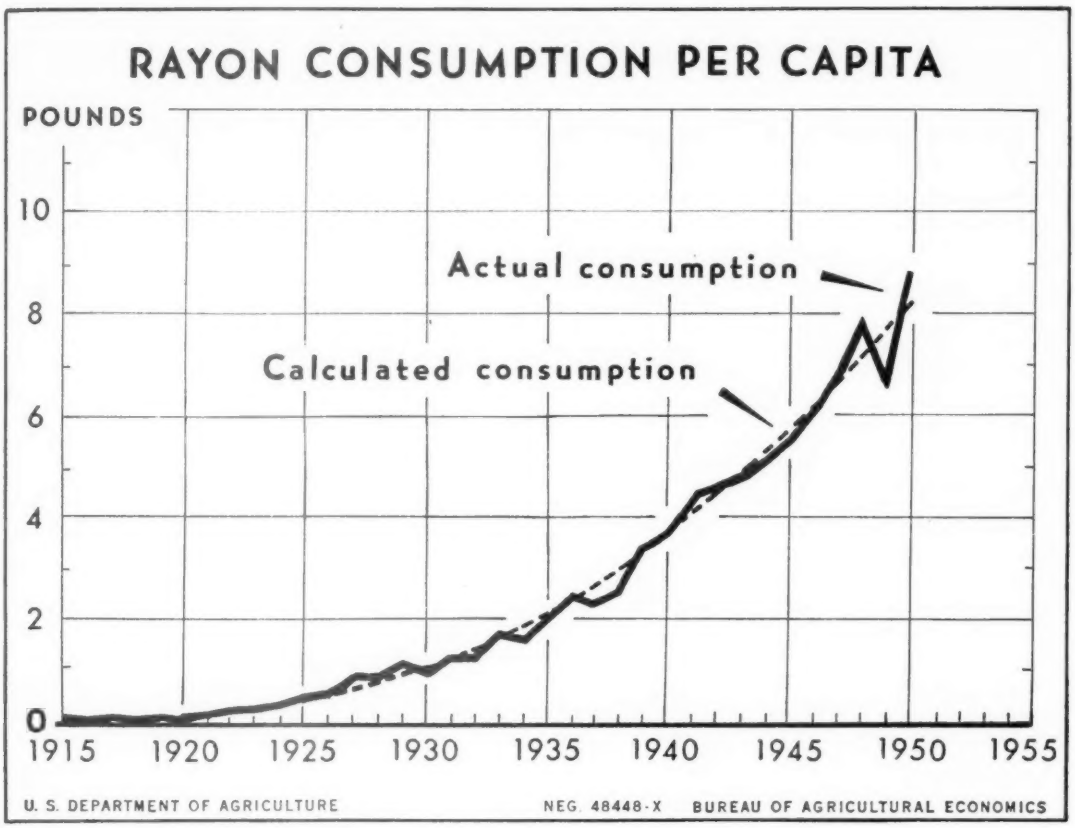

FIGURE 2.

1939,[9] about 633,000 bales. By 1950, 301 million pounds[8] of rayon[10] were used in tires, and consumption of cotton in tires had declined to about 525,000 bales.[11] The increase in the consumption of all fibers[12] and rayon, and the decrease in the consumption of cotton in tires, coincided with the development and production of high-tenacity rayon yarn. Before this development in the quality of rayon, the fiber was unsuitable for use in tire cord.

PRICE OF COTTON.—The prices of cotton consumed in mills in the United States vary from time to time, reflecting changes in the general price level, supply and demand conditions, and, to some extent, variation in the quality of cotton used. More than 600 qualities of upland cotton are consumed in the United States. It is obviously impracticable to use the price of each quality to indicate price changes. In this study the price of Middling, 7/8-inch cotton at the 10 spot markets was used to indicate the price changes of cotton. This quality was the base quality before 1939[13] and indicates the average price changes adequately for the purpose of this analysis.

From August 1933 to February 1936 a processing tax of 4 cents a pound was applied to all cotton

[9] COTTON COUNTS ITS CUSTOMERS, 1937 AND 1939, p. 14.
[10] Equivalent to about 708,000 bales of cotton.
[11] COTTON COUNTS ITS CUSTOMERS, PRELIMINARY 1950, p. 14.
[12] Total fiber consumption increased from about 311 million pounds in 1939 to about 552 million pounds in 1950.

[13] Middling, 15/16-inch cotton has been the base quality since 1939. Ten spot market quotations for its price were not available back to 1921, therefore the price of Middling, 7/8-inch was used.

used in the United States. Hence, for that period 4 cents a pound was added to the actual price.

Cotton used at a particular time is actually bought by the mills some months before its consumption. The quantity consumed is probably influenced more by the price at the time of purchase than by concurrent market prices. A more dependable analysis is therefore obtained by leading the price data 6 months ahead of other data.

To eliminate the influence of changes in the general price level, cotton prices were deflated by the Wholesale Price Index of the Bureau of Labor Statistics. The use of a non-deflated price series changed the significance and measures of our regression to only a slight extent.

Measurement of Variation in Cotton Consumption

To measure the effect of variation of the various elements affecting the consumption of cotton, a regression analysis was made using the following variables:

X_1 = cotton consumption per capita
X_2 = index of industrial production per capita
X_3 = rayon consumption per capita
X_4 = deflated average price of Middling, 7/8-inch cotton at the 10 spot markets.

Annual data for each calendar year from 1921 to 1940 and from 1947 to 1950 were used for X_1, X_2, and X_3. Annual data for a year beginning with July before the calendar year were used for X_4. As the relation between these variables approximated a percentage relationship, the regression analysis was made after converting all the original observations to logarithms. The regression equation and related measures are shown in table 3.

The analysis shows that about 79 percent of the variation in the consumption of cotton is associated with changes in the index of industrial production, in rayon consumption, and in the price of cotton. A change of 1 percent in industrial production was associated with a change in cotton consumption of 0.84 percent, ± 0.12 percent, in the same direction.[14] A change of 1 percent in rayon consumption was associated with a change in cotton consumption of 0.12 percent, ± 0.03 percent, in the opposite direction. A change in the price of cotton of 1 percent was associated with a change in cotton consumption of 0.30 percent, ± 0.09 percent, in the opposite direction.[14] In other words, the index of industrial production has a positive influence on cotton consumption, but the consumption of rayon and the price of cotton have negative influences. The net effects of each of the independent variables on cotton consumption are shown graphically in figure 3.

TABLE 3.—*Measures of the regression analysis*

Coefficient of determination, $R^2_{1.234} = 0.791$
Coefficient of correlation, $R_{1.234} = 0.889$
Standard error of estimate, $S_{1.234} = 0.030$
Significance of the regression, $F = 25.260$[1]

Partial regression coefficients	Standard error of regression coefficients	t value for regression coefficients	Partial correlation coefficients
$b_{12.34} = 0.8441$	$s_{b12.34} = 0.1251$	$t_{b12.34} = 6.7494$[1]	$r_{12.34} = .8336$
$b_{13.24} = -0.1555$	$s_{b13.24} = 0.0280$	$t_{b13.24} = 4.1265$[1]	$r_{13.24} = .6782$
$b_{14.23} = -0.2952$	$s_{b14.23} = 0.0912$	$t_{b14.23} = 3.2359$[1]	$r_{14.23} = .5862$

[1] A value this high would be expected to occur less than 1 percent of the time if the true correlation was zero.
Regression equation:
$\log X_1 = 6.900 + 0.844 \log X_2 - 0.155 \log X_3 - 0.295 \log X_4$

The analysis shows that the elasticity of price of cotton consumed by mills is small. Logically, this result is to be expected. The demand for cotton by mills is a derived demand. The demand by mills for raw cotton is determined by the production of grey goods and cotton yarn. The production of grey goods and yarn is determined by the ultimate consumers and industrial users for end products made of cotton. The cost of cotton comprises a rather small proportion of the cost of cotton end products to these users. For example, in 1939, the cost of cotton accounted for about 10 percent of the retail price of apparel and household goods.[15] Because of this relationship, cotton prices are not a major factor determining the price of end products. If the prices of end products are an important element in determining their demand and, therefore, the demand for raw cotton, the price elasticity of mill consumption of cotton would be small.

Even though the direct effect of cotton prices is small, it should be remembered that these prices are

[14] The measures are average relationships. In any specific year the measures may differ from these data. Approximately the same amount of variation is associated with an analysis that uses an undeflated price variable. However, the individual effect of industrial production, rayon consumption, and price on cotton consumption is to some extent altered.

[15] HOWELL, L. D. MARKETING AND MANUFACTURING MARGINS FOR TEXTILES. U. S. Dept. Agr., Bul. 891; March 1945, p. 6.

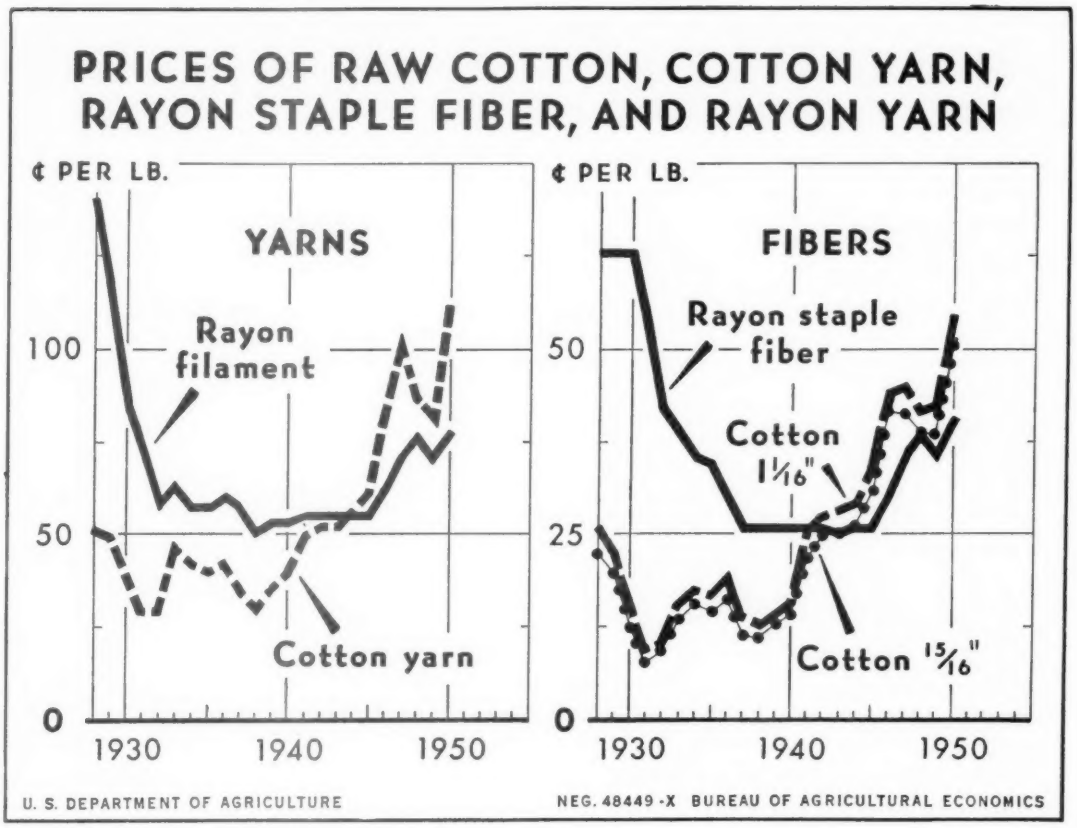

FIGURE 3.

still one of the contributing causes for the substitution of synthetic fibers for cotton. This substitution stated in percentage appears small. In 1950, an increase of 1 percent in consumption of rayon per capita would have been 0.09 pounds. This would have been associated with a decrease of 0.16 percent in consumption of cotton per capita, approximately 0.05 pounds. Therefore, a small cross elasticity in percentage terms results in a decrease of about ½ pound in cotton consumption for approximately each pound increase in rayon consumption. This absolute measure is equally significant for judging the effect of increasing rayon consumption on cotton as the regression in percentage terms. The percentage relationship is small because pounds of cotton consumed per capita are so much greater than the pounds of rayon — in 1950, 30.7 pounds of cotton to 8.85 pounds of rayon. Attention should also be called to the fact that the average per capita consumption of cotton has fluctuated from 24.0 pounds in 1921 to 30.7 in 1950. This was caused by increases in the Index of Industrial Production from .6 per million population in 1921 to 1.1 in 1950.

Consumer Acceptance or Consumer Preference

By Glenn L. Burrows

Data drawn from studies designed to measure consumer acceptance or consumer preference are frequently misinterpreted simply because it is not clear which is being measured. It is necessary to know whether consumers can distinguish between alternatives before their preferences can be established. Consumer preference seeks the motivation for buying behavior; consumer acceptance records buying behavior. Discrimination tests are necessary prerequisites to intelligent preference studies, which in turn delimit the scope of acceptance studies. This paper suggests concise definitions of acceptance and preference that should reduce misinterpretation and faulty measurement.

CONFUSION ABOUNDS in the literature describing investigations of consumer acceptance and consumer preference. The two basic causes are the same two that cause confusion throughout the whole field of investigative research. The first is the failure to define precisely, and suitably restrict the subject of investigation. The second is the failure to employ a technique which can meet the objective.

The fact that consumers buy more of one product than of another which they prefer appears either a source of consternation to marketing researchers or justification for ignoring as unimportant one action or the other. Consequently, researchers struggle with diverse techniques of which no two measure precisely the same thing, and some of which measure neither acceptance nor preference.

It is not the purpose of this paper to discuss techniques nor to plead for more measurement; it is hoped that by focusing attention upon definitions, such measurements as are made can be more meaningful.

Acceptance Defined

The term "acceptance" of a particular commodity as most frequently measured involves either a measure of those quantities bought or of the number of consumers who buy the commodity when the "usual" alternatives are offered in conjunction therewith, and the price and income structures are known and fixed. The time interval, the population of consumers, and the members of the class of alternatives are stated or assumed to be known.

Imagine, for the sake of simplicity, two test commodities A and B. It is desired to measure their acceptance in retail stores in which a single logical alternative C is offered for sale. Let a, b, c represent the volumes sold—number of consumers—of A, B, C, respectively. A subscript will be employed to denote how and where each is measured—A and C in the same stores might sell in amounts a_1 and c_1, respectively, whereas B and C in other stores, or in the same stores at another time, might sell in amounts b_2 and c_2, respectively. According to the particular author's interpretation, either a_1, or $a_1 + c_1$ reduced perhaps to a per store average, has been interpreted as the acceptance of A; a_1 and b_1 or $a_1 + c_1$ and $b_2 + c_2$ similarly adjusted have frequently been employed to serve as measures either of relative acceptance or of preference for A and B.

One can easily understand the appeal to such data to decide questions about acceptance or preference. It is not too difficult to see why at times "a," and at other times "a + c" per store might have been adopted as acceptance measurements of A. In instances in which neither the introduction of A nor that of B materially affects the normal volume of C, or in which their effects are substantially the same, there is temptation to conclude that "a" and "b" measure the relative acceptance of A and B. This is a dangerous conclusion, for even in this instance their values, their difference, and their ratio, are almost surely dependent upon store volume of business as defined by any reasonable measure. Granting this, if it is desired to demonstrate only whether $a_1 + c_1$ is greater than, or less than, $b_2 + c_2$, then totals and averages are probably less

important than measures of store-to-store consistency of the direction of the inequality. This consistency is the only sample evidence of reliability in such an acceptance measurement.

A more useful definition of the acceptance of A would employ the same measurements "a" and "c," but would treat them simply as a pair of numbers, that is, a vector quantity: (a,c). Note that if number of persons buying is used instead of quantity bought, and if the acceptance is that by a single individual, the vector can assume only one of four forms: (1,0), (0,1), (0,0), (1,1).

Among the advantages of such a definition are:

(1) An individual consumer's acceptance is defined, and methods are immediately available for extending to groups of consumers who patronize a particular store or several stores.

(2) The method of combination of vectors is not specified. Thus, for example, the nature of the dependence upon size of store is clear from store-to-store variations in the vector, making possible more precise inference about results to be expected in other stores with specified volume of sales.

(3) The method of combination of the vector components is not specified so that differential economic losses or gains attached to increases and decreases in "a" and "c" make possible realistic comparisons of vectors such as (a_1,c_1) with (a_2,c_2) and of (a_1,c_1) with (b_2,c_2) in which a_1 is not necessarily equal to a_2, c_1 is not necessarily equal to c_2, and $a_1 + c_1$ is not necessarily equal to $a_2 + c_2$.

Preference Defined

No semblance of unanimity exists among interpretations of consumer preference. Differences in definition appear not only among different investigators, but from one study to another, and even from one subject to another within the same study by the same investigator. It is not surprising therefore that preference and acceptance have frequently been mistaken one for the other.

The word "prefer" indicates a certain ranking; an assertion that one member of a class of alternatives is preferred to another clearly identifies at least two members of the class. Thus it would appear that if either individual or group consumer preference for a number of commodities were to be measured, a ranking of these commodities by the consumers is sought. The class of alternatives may well consist in part of those constituting the "usual" environment, but in a measurement of preference among a group of commodities every consumer must rank every member of the group.

Once this is recognized it becomes clear that acceptance is just a special case of preference in which the class of alternatives consists of only one test commodity, together with those constituting the "usual" environment, and the ranks are measured by quantities bought or number of consumers buying. Also, the acceptance of A and of B—the pair of vectors (a_1,c_1), (b_2,c_2)—whether for the same or different consumers, cannot be interpreted to yield a measure of preference for A and B.

The author of a recent publication,[1] in which several marketing research techniques are compared, has this to say of the "usual" environment: ". . . a consumer purchases or doesn't purchase what is offered on the basis of comparisons *between* stores and not *within* a given store. In a matched-lot study consumers purchase one lot or the other on the basis of a comparison of lots immediately adjacent to one another. . . . Matched lots might possibly be used to indicate preference but they do not indicate the extent to which this preference can be translated into purchases under normal conditions."

Here is the distinction between acceptance and preference succinctly put, with an apt warning to those who would mistake one for the other. It is to be hoped, however, that this author would not seal the fate of consumer and of competitive supplier alike for want of knowledge of consumer preference for a commodity whose misfortune it is to enjoy, in whatever form, inelastic demand.

A knowledge of consumer preference, properly utilized, can be an intelligent guide to so-called education and advertising campaigns or to the modification of a salable product. Preference studies frequently answer the question of why consumers buy or do not buy a product, and are therefore the logical precursors of many acceptance studies. They limit the forms of a product which must be subjected to acceptance measurement and demonstrate the existence of alterable preferences founded upon ignorance, prejudice, or fancy. Acceptance measurement records behavior, but it is an expensive tool with which to ascertain the motivation for that behavior. In acceptance tests, the investigator must provide the stimuli to consumer behavior; in preference studies, he is frequently

[1] New York (Cornell) Agricultural Experiment Station. Methods of Research in Marketing. July 1951.

seeking those stimuli.

Certain properties of preference have been discussed; one further desirable property will be noted before attempting a definition. Because individual consumers express a preference among a group of commodities, and because some measure of the collective preference of a number of consumers is desired, it would seem that, whatever the definition, group preference should reflect in some way the preferences of members of the group, and should itself be a preference of the same form as that defining an individual's preference. This principle is not universally recognized. The definitions that follow interpret preference as it frequently occurs in the literature, but the first three do not meet this requirement.

(1) Individual preference among three alternatives A, B, C is the vector (a, b, c)—a, b and c might be the quantities purchased of A, B, and C, respectively, by the individual during a specified time interval, in stores that offer simultaneously all three alternatives at fixed prices. They may be defined alternatively as either zeros or ones, depending upon whether the individual bought or did not buy the particular alternative. They may be simply numbers capable of assuming a well-defined set of values. They may be merely the letters a, b, c—the order is assumed fixed whenever a, b, c, assume numerical values. If only the letters a, b, c, are used, their order signifies the order of preference; ties (that is, no preference) in this instance will be indicated by a repetition of the first letter of the tie. For example, if an individual prefers C to B to A, his preference vector is (c,b,a); another who prefers C to A or B, but who has no preference among A and B, would have a preference vector (c,a,a).

This can easily be extended to accommodate any number of commodities. Group preference is to be a vector whose coordinates are, respectively, the numbers of times a, b, and c occur first among the individual preference vectors. A repeated letter shall be counted as 1/n for each of the letters it stands for, and n is the number of repeats. Thus in (a,a,b), a would count as ½ for a, and ½ for c.

(2) Individual preference defined as above; group preference defined as a set of 3 vectors, one for A, one for B, one for C, each constituted by the number of times its corresponding commodity placed first, second, and last, frequencies calculated as in (1).

(3) Same as (1) except that the coordinates of the group-preference vector are the respective sums of the elements in the A, B, and C vectors in (2)

The following definitions do satisfy the requirement.

(4) Individual preference defined as above; group preference to be the most frequently occurring individual preference vector. (We shall assume there is a most frequently occurring vector. This will usually be so in a random sample of considerable size from a larger group).

(5) Individual preference defined as previously; group preference a vector consisting of the elements (a,b,c) ranked in order of the magnitude of their corresponding frequencies determined in (1).

(6) Same as (5) except that frequencies are determined as in (3).

These illustrations suggest that individual preference could be defined as a vector and, in fact, that it is frequently thought of as such. But this is an over-simplification that stems from desire to relate preference to a particular form of consumer behavior, and actually diminishes the worth of a preference measurement. An improvement would be to define it as an array of vectors—that is, a matrix, the rows of which are preferences for each specific attribute common to the various alternatives. The attributes may be those of size, color, utility, durability, aroma, cost, and so on ad infinitum. The elements of the row vectors may be different for different attributes. There is no reason why they should be required to be the same; some may not even be quantified.

It would be difficult and may be impossible to formulate a rule of combination of these vector preferences into a single preference vector. Different individuals probably employ different rules. It is not certain that the same individual employs the same rule when he records his preference in different behavior patterns. At different times an individual's expression of his preference, regardless of the form of behavior interpreted as an indicator of preference, takes account of different row preference vectors. Consequently, one may obtain, at different times, different expressions from the same individual, even though his preference matrix may have remained stationary.

This disconcerting state of affairs has led, on the one hand, to complete rejection on the part of some researchers of all preference measurements and,

TABLE 1.—*Sales of Florida potatoes in test stores in Baltimore, Md.*

Week	Sales							
	Red Bliss			Others	Pontiac			Others
	Store No.	Waxed	Not waxed		Store No.	Waxed	Not waxed	
		Pounds	*Pounds*	*Pounds*		*Pounds*	*Pounds*	*Pounds*
Mar. 16-Mar. 22	1	778	169	4,035	3	300	200	2,465
	2	713	53	4,450	4	847	120	4,545
Mar. 30-Apr. 5	3	641	156	2,810	1	450	103	5,210
	4	692	176	4,525	2	560	106	3,330

on the other, to careless conclusions about the fluctuation of individual and group preferences. One school of researchers maintains that the individual must not be prompted in expression of his preference to consider other attributes than those he desires, because this allegedly creates for him an unnatural preference pattern. Either failure to combine the same rows, or the use of different rules of combinations, is sufficient to account for the fact that an individual may rank subgroups of alternatives inconsistently with his simultaneous ranking of all members of the class of alternatives from which the subgroup was selected.

These phenomena are to be expected. Far from discouraging the use of preference measurements, they should stimulate rather more accurate evaluation and wider application of different measuring techniques, for it is only by such means that the reasons for consumer behavior will become known. But it is exceedingly important that the objective of the measurement be kept firmly in mind, that appropriate techniques be employed, and that the observations really substantiate the inferences drawn therefrom.

The matrix definition of preference previously suggested should provide more information than any single preference vector, and its nature should assist in preventing its misinterpretation. In practice, the distinction between acceptance and preference would be less obscure than formerly, and consequently the confusion of terms would be diminished.

Acceptance and Preference Illustrated

The opportunity for confusion of acceptance for preference, and the converse, is illustrated by the results of a study presented in tables 1 and 2. This study was carried out under the Research and Marketing Act of 1946 as a part of Southern Regional Project SM5 "Spoilage in Marketing Early Irish Potatoes" and reported by R. E. L. Greene in *Consumer Acceptance of Waxed and Colored Potatoes.* The data given here, only part of those in the original publication, have been selected to illustrate both the basic design of the study and some points relevant to this discussion. Consequently the conclusions drawn here may be somewhat different from those based upon the whole of the experimental evidence. Readers who are interested in the over-all implications of the study are referred to the report of the experiment.

The data selected illustrate boldly the difference between acceptance and preference. The commodities under test are Florida potatoes of two varieties, Pontiac and Red Bliss, both offered to consumers in two forms: (1) Thinly coated with a wax emulsion containing a small amount of United States certified red color, and (2) not waxed. Table 1 shows the volume of sales of the test commodities in four test stores for 2 weeks of the test period.

The study plan required each of eight other stores to offer only one of the two Florida varieties, and only one form of that variety at a time, in addition to its customary offerings of potatoes. Table 2 shows the volume of sales for the four stores offering the Red Bliss variety during the selected 2 weeks of the test period.

No measurement of preference for varieties is given in either table because consumers in no store were allowed a choice of the two test varieties.

TABLE 2.—*Sales of potatoes in four test stores in Baltimore, Md.*

Week	Sales							
	Red Bliss Waxed			Others	Red Bliss Not Waxed			Others
	Store No.	Total	Percentage of total	Total	Store No.	Total	Percentage of total	Total
		Pounds	*Percent*	*Pounds*		*Pounds*	*Percent*	*Pounds*
Mar. 16-Apr. 22	1	528	18.2	2,370	3	547	21.1	2,050
	2	484	15.7	2,600	4	390	9.6	3,665
Mar. 30-Apr. 5	3	407	19.9	1,640	1	576	18.2	2,590
	4	640[1]	11.9	4,735	2	588	19.4	2,450

[1] Store 4 offered Pontiac waxed on March 30 instead of Red Bliss waxed; the sales shown are totals of all waxed potatoes for the week.

However, the conclusion from these selected data is undoubtedly the same as that of the author of the aforementioned report: "When given an equal opportunity to buy waxed and unwaxed potatoes (of the test varieties), consumers exhibited a decided preference for those that were waxed and colored."

If one had no other data than that in table 2, it would seem difficult to conclude that the volume of sales of waxed potatoes is any different from that of unwaxed potatoes. Again it should be noted that the data were purposely selected from a larger body of data. The length of the periods of observation and the number of stores involved are not of present concern. It is relevant to the discussion only to indicate that it is possible for consumers to exhibit marked preference for commodities for which there is no experimental evidence of differences in acceptance. In the face of such evidence, a distinction between consumer acceptance and consumer preference must surely be made.

Book Reviews

Monopoly and Free Enterprise. By GEORGE W. STOCKING and MYRON W. WATKINS. With the Report and Recommendations of the Committee on Cartels and Monopoly. The Twentieth Century Fund, New York. 596 pages. 1951. $4.00.

AGRICULTURAL ECONOMISTS should find this competent presentation, by outstanding authorities in the field, of particular interest.

In 1933, Mordecai Ezekiel and Louis Bean, in their pamphlet, *The Economic Bases of the Agricultural Adjustment Act,* published by the U. S. Department of Agriculture, pointed out that many farm commodities were sold on markets where free competition still prevails, while a substantial number of the products of industry were sold under conditions of partial or total monopoly. By providing information on production and trade, this new book should assist the agricultural economist to view the conditions underlying agricultural production and marketing in better perspective.

Unfortunately, this work presents insufficient data and analysis to show how our economy would operate without large-scale industry and it does not indicate in what ways a return to more complete competition would be superior to our present organization. Moreover, the capacity of unrestrained competition to organize our complex structure of production and distribution without economic anarchy is not explored in any detail.

Predilection in favor of free enterprise leads the authors to view with jaundiced eyes the efforts of the Government, since 1933, to improve the economy by raising farm income through agricultural adjustment and by improving labor's economic position through more orderly collective bargaining.

Unexplained also is America's predominant economic position among nations in spite of partially monopolistic industry with its attendant restraints upon production. Perhaps our relative economic well-being can be explained, in part, by the size of our national income and the pattern of its distribution. Improved farm and labor income may have played important roles.

The authors' apparent contention is that there would be more goods at lower prices if restrictive monopolistic practices were curbed and that our economic strength, relative to that of other nations, may be due to the greater prevalence of competition here than abroad.

We still do not have enough material to know how far along the road of competition we can go with the greatest profit. The authors have done excellent work in ferreting out the available information, digesting it, and presenting it in logical form.

There is no doubt that any economy could be improved, and in many chapters the authors seek to show how this improvement could be attained. The chapters on patents and monopoly, incorporation policy, the basing point system, and trade associations, are particularly good in this respect.

The book has two parts: Fifteen chapters on aspects of monopoly and free enterprise, prepared by Stocking and Watkins and an obviously competent but anonymous research staff; and another chapter, A Program to Promote Competition, which is the Report of the Committee on Cartels and Monopoly of the Twentieth Century Fund. A Supplementary Comment, written on a note of dissent by one member, is appended, which states:

"An objective study is urgently needed that will concentrate, not on the shortcomings of American business, but on what it is that has enabled American companies, both large and small, to grow, to achieve commercial success, and to contribute to giving the American people the highest living standards in the world."

This point is well taken, for the bulk of the professional literature on monopoly is not free from prejudice against big business. This attitude derives from the bias present in the data upon which this literature is based; court records and proceed-

ings in antitrust suits and investigations by regulatory bodies, committees, and commissions interested in the social control of business.

The spirit of self-examination which this book reveals is one of the reasons for America's success. We are never so well off that we cannot see our faults and nothing is ever so good that it cannot be improved. Works such as this contribute to our improvement by making for enlightened public opinion and action.

Max J. Wasserman

American Capitalism. By JOHN KENNETH GALBRAITH. Houghton, Mifflin Co., Boston. 217 pages. c1952. $3.00.

A FACILE PEN and a much better than average vocabulary have produced for the intelligent layman a much more accurate description of American capitalism than has thus far been written by an equilibrium economist. Besides serving the purpose of promoting a better general understanding of the American economy, it should serve as a further aid in giving American economists a better perspective for appraising classical, neo-classical, and Keynesian economics.

Following Lord Keynes, Galbraith points to Say's Law as the Achilles heel of classical theory. Then a major concession is made to Veblen and Commons when he says quite correctly that economists have made a fetish of the neo-classical concept of "social efficiency," and goes on to explain that the American level of living has constantly risen in the face of persistent violation of the competitive model because of improvements in another type of social efficiency which he calls "technical development."

More influence on modern economic history is attributed to Keynes than to Roosevelt. This can be dismissed as a pardonable exaggeration of the merits of the Lord by a disciple. There can be little doubt that the volume of deficit spending endorsed by Roosevelt would have been essentially the same if Keynes had never written his formula.

The heart of the book is the explanation of why the Keynesian formula fits the facts during peacetime, when the purpose is to protect the economy from excessive depression or deflation, and why it will not be allowed to protect the economy from inflation during wartime or when the Nation is preparing for war. This explanation is built around what the author calls a theory of "countervailing power."

When employment is less than full, politicians are willing to reduce taxes and increase spending, and the economic power of oligopolies is checked by the countervailing power of other groups such as trade unions. In wartime, politicians are unwilling and unable to raise taxes as much as they are willing to increase spending. Fuel is added to the flame of inflation at this time because trade unions and other countervailing powers gang up with the oligopolies against the public. There is no answer to this but "centralized decision" or government control. Hence, if capitalism is defined as "decentralized decision," its future in wartime is bleak indeed.

This is essentially what the publishers of the book mean when they label it "A bold new concept of the balances of power in the last refuge of avowed capitalism." No doubt it is new to those who have never heard of it before. What it means, of course, is that the longer we remain in a state of war or fear of war the more certain it is that we shall have to continue changing our avowed meaning of capitalism.

A defect of the book, in the opinion of this reviewer, stems from the author's preconception of economics as an equilibrium of forces or a self-generating *mechanism* instead of a volitional process. Under this preconception he can characterize the development of countervailing power as "normal." He can say that it was not John L. Lewis or Phillip Murray who developed the power of their unions but U. S. Steel—which is not essentially different from saying that Providence or Nature developed U. S. Steel and the human or "artificial" purpose of a Gary or a Fairless had nothing to do with it.

Such connotations also blur his otherwise real-

istic conception of government or the State. He holds that "the" major domestic function of government is to develop countervailing power as a means of approaching ideals not attainable by free competition. But the State *is* an organization of powers, and any change in the exercise of those powers can only be achieved by those who are interested and are politically or economically powerful enough to force the issue—not merely by some definition of *proper balance* formulated by a government official. He seems to waver between a clear understanding of this fact and the notion that the State is something wholly rational and acting apart from the conflict itself.

Yes, ideas are powerful forces for change, but in social science they include ethical ideas of equality, democracy, and justice—not merely the ideas of a self-regulating mechanism so characteristic of natural science.

What the author calls countervailing power is a part of the economics of collective action, and includes what is usually called collective bargaining power. That he should say the concept "has gone unrecognized in economic and political theory" suggests that he may be following the advice usually given to amateur duck hunters to shoot like blazes and claim everything that falls. Even so, progress is being made in social science when an economist realizes that "In a book like this the line between economics and politics must truly be an imaginary one—it is a parallel that must be crossed and recrossed without consultation even with the reader."

This book should be valuable as a text to teachers interested in clarifying the limitations, as well as the usefulness, of orthodox theory.

Bushrod W. Allin

The Economics of Mobilization and Inflation. By SEYMOUR E. HARRIS. W. W. Norton & Co., Inc., New York. 308 pages. c. 1951. $4.50.

THE BULK of this treatise is a very competent analysis of the problems arising in a mobilization economy, their magnitude under varying assumptions, and methods for meeting them. Major emphasis is on monetary and fiscal problems, with such physical aspects as allocation, rationing and efficiency of production dealt with in global terms and somewhat slighted. The limitations placed on increases in the Gross National Product by our resources and by possible increases in efficiency are carefully examined. On balance, Harris is cautiously optimistic. He projects a substantial increase in GNP, but one insufficient to meet all military needs. The text then takes up the extent of the inflationary potential expected from estimates of the magnitude of the mobilization effort and of these productivity projections. In the light of this problem Harris considers Government expenditures, taxation, savings, and monetary policy. Also discussed are direct controls as supplements and substitutes for some monetary and fiscal measures. The final sections point out the dangers and welfare aspects of a failure to deal with inflationary and related problems of a mobilization economy.

A major theme of the book is the difference between World War II and a current defense effort. Harris convincingly documents his belief that, although the last war effort was supported largely out of increased output and was accompanied by an increased level of living, any substantial defense effort would now be possible only at the expense of current consumption. This necessity for civilians to share economic hardships rather than benefits would vastly complicate most facets of a defense program.

The value of this book to the administrator is as a background work which succeeds admirably in sifting and relating in a meaningful way a vast array of data. No outstanding contributions to either economic theory or methodology are made, nor is there an analysis of specific problems that administrators would face in developing a particular program. It represents rather the application to the problem of mobilization of a wide range of economic techniques and theory. Especially valuable in this respect is the implicit reminder of the many facets that need to be considered in the formulation of the problems and plans for their solution. Another important contribution is the tre-

mendous volume of current and historical facts and statistics here assembled. In fact, one sometimes has the impression that the author could not forbear to include some data not directly relevant to his main thesis. His detailed discussion of price supports for agriculture, for instance, is not important to the problem he discusses, but the data and opinions on this subject may have been at hand and therefore included gratuitously.

The projections of economic developments in mobilization, which constitute the bulk of the book, could be criticized for either their assumptions or the data used. The latter is impossible for one who is not actually operating with these data, when an experienced practitioner like Harris has employed them. The assumptions are always clearly identified and alternatives are presented. As assumptions in formulating mobilization policy are inevitably based on high-quality guess work, the author's are probably as valid as any that could be made without access to the plans of the Kremlin.

The basic assumptions of the book may be more directly controversial. The premises are, to a considerable extent, those of the present Administration. While the author evaluates alternative control methods, he accepts controls as necessary evils and does not doubt the need for them even in a mobilization economy short of total war.

It is a minor point to note that in his discussion Harris ignores underemployed agricultural and other workers as potential sources of manpower for defense production.

There is no question that the book is extremely timely and addresses itself directly to some of the major problems we face today. A corollary of this timeliness is that substantial portions of it will quickly become obsolete.

Gustav F. Papanek

Economic Mobilization and Stabilization. By LESTER V. CHANDLER and DONALD H. WALLACE. Henry Holt and Company, New York. 610 pages. 1951. $4.50.

FOR THE MOST PART, Professors Chandler and Wallace have drawn on existing publications for this volume, which has the subtitle, "Selected Materials on the Economics of War and Defense." The authors' declared purposes in writing the book were (1) as a text, or a set of materials, for a college course in the economics of war and defense, and (2) as a reference work for administrators, legislators, editors and commentators, leaders of organized groups, and the general public. These purposes are admirably served.

The book is divided into six parts. Part I, prepared by the authors, presents the basic economic problems of war and defense programs. Professor Wallace discusses economic controls in full war and makes some pertinent proposals for their development should the United States become so engaged.

Parts II to IV are concerned with the economic problems of full war, such as the problems of production and allocation, manpower, finance, price and wage controls, and rationing. A large part of the materials in this section was drawn from Government reports on World War II experiences including, "Industrial Mobilization for War: History of the War Production Board and Predecessor Agencies, 1940-45" (1947); "The United States at War," U. S. Bureau of the Budget (1946); "Problems and Policies of Dispute Settlement and Wage Stabilization in World War II," U. S. Bureau of Labor Statistics (1950); and "A Short History of OPA" (1949).

Part V is concerned with the economics of a limited defense period. It contains the Fifth Annual Report to the President by the Council of Economic Advisors, December 1950, and articles by A. G. Hart, J. K. Galbraith, and others. Part VI evaluates several programs for economic control during a full-scale defense period. This section appraises the traditional system of economic controls—traditional in the sense that it was used during World Wars I and II—the so-called "disequilibrium system," which tolerates large excesses of incomes over permissible consumption, with prices restrained by ceilings. The pay-as-you-go program is also appraised and found wanting, mainly because the tax program necessary to pay

for a full-scale defense program would have to be so large as to restrict the incentive to produce. The authors of this section, E. S. Shaw and L. Tarshis, present their own program, which involves expenditure rationing and neutralization of all funds in excess of the level of consumption available. There is some mention of the constant purchasing power bond as a means of encouraging the diversion of income into savings channels. Under this program, the authors contend that price controls would not be necessary. Part VI and much of Part V were drawn from the March 1951 issue of the *American Economic Review*.

It is clear from this set of materials that economists know what inflation is, how it arises, and what tools are necessary to prevent it, although some of the proposals suggested by economists are not easily acceptable politically. Perhaps the major differences among economists relate to the importance allocated to each of these tools. It is also clear that no single tool, such as pay-as-you-go taxation, will suffice. We need only to go back to the period following the Korean outbreak when one of the sharpest price rises in modern times occurred despite the fact that the Federal Budget was not operating at a deficit. The price impetus was generated largely by spending that was taking place in the private sector of the economy which was fed by large amounts of liquid assets.

Perhaps the major weakness of the book is that the section on the economic problems of a limited defense effort (Part V) is not so well rounded as the other sections, because relevant materials were scarce. Furthermore, the materials included were prepared against an economic background in which the inflationary process was clearly evident and practically all anti-inflationary devices appeared to make sense. This is not true today. Prices in many wholesale markets are lower than they were a year ago. Consumers have slackened their spending and increased their savings voluntarily, which did not appear probable a year ago. In some areas unemployment has developed, not wholly due to material shortages. In the light of these developments, stabilizing the economy today is not entirely the one-sided, anti-inflationary program that seemed appropriate at the time the book was written.

Nathan M. Koffsky

Linear Computations. By PAUL S. DWYER. John Wiley and Sons, Inc., New York. 344 pages. 1951. $6.50.

Statistical Methodology Reviews, 1941-50. Edited by OSCAR KRISEN BUROS. John Wiley and Sons, Inc., New York. 453 pages. 1951. $7.00.

PROFESSOR DWYER'S book is written "for the purpose of aiding the many workers in a variety of fields who have the general problem of finding numerical solutions for sets of simultaneous equations." Agricultural economists encounter this problem most commonly in connection with multiple regression (correlation) analysis, as in deriving statistical demand or supply curves and various types of estimating equations.

The textbooks on economic statistics with which this reviewer is familiar describe the solution of "normal equations" in terms of elementary methods with which high-school graduates are presumed to be familiar. Typically, the students work out a correlation problem on obsolete calculators, recording each individual cross-product, and finally solve the normal equations by the textbook method. At the end of this process, all but the most ardent have concluded that regression equations are prohibitively difficult to come by, and that "research" reports can be written more rapidly if the data are merely described and not analyzed.

As a result, many economists fail to realize three major sorts of efficiencies which can make regression analysis a relatively easy and inexpensive research tool. The first of these efficiencies lies in proper use of the calculating machine itself. With modern desk calculators, the results of many individual operations of multiplication or division can be cumulated in the machine, and the work of recording greatly reduced. On page 45 of his book, Dwyer lists 13 "operational units" (combinations

of basic arithmetical operations) which can be handled on modern calculating machines, including the relatively familiar one of cumulating the cross-products needed in regression analysis.

The second sort of efficiency lies in abbreviated methods of solving the normal equations. Earlier chapters of this book give abbreviated methods based on elementary algebra. For handling problems involving more than four variables, or problems in which variables may be added to or dropped from the original set during the course of an investigation, the most efficient methods involve use of the inverse matrix. Chapter 12 gives a 10-page introduction to the algebra of matrices, and Chapter 13 relates it immediately to the solution of simultaneous equations. Numerical examples are carried through in this and the following chapter. These three chapters provide a rare opportunity for non-mathematical economists to find out what matrices are about, and to obtain some insight into "what goes on" in modern econometric articles in which matrix notation is used freely.

The third sort of efficiency so far as the professional researcher is concerned lies in turning over the routine labor of regression analysis to clerical assistants. The ideal situation, of course, is to have a special computing unit with expert supervision that can take over the entire work of calculation, using compact methods, adequate checks, and first-class equipment. If a computing unit is too expensive for a single department to maintain, it may be feasible for a group of departments or divisions at the same location. Failing this, a clear set of instructions, possibly with mimeographed forms for recording items that must be written down, should make it possible to use less specialized clerical workers or student assistants. Such instructions and forms could be developed on the basis of Dwyer's examples.

The major new contribution in the book appears to be a systematic treatment of the problem of errors in linear computations, including an analysis of the effects of errors in the original data as well as those due to rounding and to outright mistakes in calculation.

This book is so organized as to serve as a text for a course on linear computation or for individual study. It is also intended as a reference book for workers in applied fields. Persons whose work calls for extensive use of regression analysis or involves other types of simultaneous linear equations will do well to examine it.

BUROS' book contains excerpts from 842 reviews of books on statistical methodology that appeared during the last decade. Of the 342 books listed, more than 120 are merely noted and about 70 are represented by a single review. Often this reflects the specialized character of the method used and its limited area of application. Some of the more important and more general books are represented by 10 to 15 reviews, and a fourth of the total space is taken up by reviews of 10 books. The "master work" of the decade, judged by the review space given it, is Kendall's *The Advanced Theory of Statistics*. Considerable attention is given to Thurston's *Multiple Factor Analysis*, Kelley's *Fundamentals of Statistics*, and Cramér's *Mathematical Methods of Statistics* and to texts by Hoel, Peatman, Ezekiel, Weatherburn, and others. In addition to general works on probability and mathematical statistics, major areas of application are well represented. Quality control, education and psychology, business and economics, medicine and public health, biology and biological assay are among the headings in Buros' classified index.

The book is a useful starting point for any survey of recent developments in either theoretical or applied statistics. Serious students will profit by the higher criticism of such reviewers as M. G. Kendall, Joseph Berkson, John Tukey, Edwin B. Wilson, Harold Hotelling, and Abraham Wald, to name a few. As reviewers, the great statisticians of the decade take on human qualities seldom recognizable in their formal articles and books.

Mature workers in an applied field may get new insights from the reviews—and even the titles—of books in other fields. As a transient example of this, "probit analysis" (Buros, page 126), which normally deals with such matters as estimating the proportion of insects that will be knocked out by a given chemical dose, might have some value in conceptualizing the effect on potential purchasers of houses, automobiles, or tractors, of a given "dose" of credit regulation or price increase.

Karl Fox

The Transportation Economics of the Soybean Processing Industry. By EARL C. HEDLUND. University of Illinois Press, Urbana. 189 pages. 1952. $3.50.

THE OBJECTIVE of Mr. Hedlund's study is to evaluate the importance of costs and other aspects of transportation in the soybean-processing industry, with special reference to the influence of such factors on the location of processing plants. In a larger sense, it is an excursion into locational theory—economics of location; but the study seeks specifically to test whether, from the standpoint of that theory, the present organizational set-up of the soybean-processing industry can be economically justified.

Some attention is first given to the historical development of locational theory from its beginnings under Von Thünen to recent studies by F. H. Sparks in southern California. The author then formulates his own theory of location with a much greater emphasis on transportation than earlier statements of location economics gave it. Important elements in the author's "workable theory of location" are the degree of weight lost by the materials in processing, the transportation rate per ton-mile for moving raw material and product, and the degree to which the general rate level is based on the "distance principle." Other essential components include a complete analysis of market areas, availability of fuel and power, labor supply and costs, certain personal factors of a rational or irrational nature, and availability of capital.

A measurable amount of background material is provided concerning both the soybean industry and general transportation economics. A discussion of the location and growth of production areas and the utilization of the soybean is followed by a description of processing methods and product utilization. One who is not well informed regarding soybeans will gain from the book a new appreciation of this fourth largest cash-grain crop in the United States.

The most significant feature of the book is its detailed discussion of the institution of *transit*. Transit is defined as the privilege of stopping a shipment en route to enable a process or operation to be performed on the article, and of reshipping to final destination at the through rate applicable from the original shipping point to destination. The impact of this device is so great on so much of the American industry that it deserves the three chapters devoted to its analysis. Without specific application to any product, the transit problem is presented from its technical, operational, legal, and economic standpoints. This section of the book would be useful as collateral reading in a course in Principles of Transportation.

One has the feeling that while the author is far from convinced of the economic soundness of transit, he nevertheless recognizes that too much of our present industrial organization is built on it to encourage the contemplation of any drastic changes or departures from the present practice. In later chapters, the influence of the transit privilege and the general rate structure are given practical application to the soybean-processing industry.

The author concludes that the industry as now organized conforms with the transportation economics which condition it. The important transportation factors affecting the location of processing plants are given as: (1) Necessity of locating so as to be able to reach many widespread markets; (2) existence of the transit privilege; (3) the loss of weight in processing; (4) nonapplication of the through rate to soybean oil under transit; and (5) rate relationship between soybeans and processed soybean products. When he gets to the soybean-processing industry, the author gives little attention to the nontransportation factors included in his "workable locational theory." If he had, one wonders whether Mr. Hedlund would be as well satisfied with the present location of the plants.

Joseph E. Rickenbacker

Selected Recent Research Publications in Agricultural Economics Issued by the Bureau of Agricultural Economics and Cooperatively by the State Colleges[1]

BARLOWE, RALEIGH. ADMINISTRATION OF TAX-REVERTED LANDS IN THE LAKE STATES. Mich. Agr. Expt. Sta. Tech Bul. 225, 77 pp. East Lansing, December 1951. (BAE Cooperating.)

The major problem in State and County land administration centers around the administrative policies applied to the almost 15 million acres of forest lands now in State and County ownership. Present prospects appear to indicate more rather than less popular and legislative support for public forestry in the future.

BILKEY, WARREN J. THE BASIC RELATIONSHIP IN CONSUMER EXPENDITURE BEHAVIOR. 66 pp. Cambridge Mass. October 1951. (Harvard Studies in Marketing Farm Products 4-H; (RMA; BAE Cooperating.)

Concerned only with theoretical aspects of consumer behavior. Objective in making the study was to explore the general nature of consumer behavior to develop a working hypothesis that could serve as a guide for future research.

BONSER, HOWARD J., and DAVIS, JOE F. ELECTRICITY ON FARMS AND IN RURAL HOMES IN THE EAST TENNESSEE VALLEY. Tenn. Agr. Expt. Sta. Bul. 221, 63 pp., illus. April 1951. (RMA; BAE Cooperating.)

The bulletin reports upon the use of electricity on 492 farms and 79 rural non-farm residences. Two-thirds of the cases were supplied by municipal distribution systems and the remainder by cooperatives. All electric power was generated within the TVA system.

BORTFELD, C. F., and DAVIS, JOE F. ELECTRICITY ON FARMS IN THE WINTER WHEAT AREA OF SOUTHWESTERN KANSAS. Kans. Agr. Expt. Sta. Bul. 351, 62 pp., illus. December 1951. (BAE Cooperating.)

The report provides basic information on farm electrification which can be used as a guide to estimate the future total use of electricity on farms and the specific applications that probably will be made of this form of energy.

HARRIS, MARSHALL, and THARP, MAX. CASE STUDIES OF FATHER—SON FARM AGREEMENTS. Southern Farm Management Extension Publication 2, 48 pp., illus. [1951] (Clemson Agr. Col. and U. S. Dept. Agr., Ext. Serv. Cooperating.)

Provides valuable reference material of actual experiences of fathers and sons in trying to work out satisfactory family agreements for the operation of home farms.

HESTER, O. C. EGG MARKETING CHANNELS AND METHODS USED BY NORTHEASTERN PRODUCERS. U. S. Dept. Agr. Agr. Inform. Bul. 69, 31 pp., illus. 1951. (RMA.)

The study upon which this report is based was planned and developed in cooperation with the Northeast Regional Poultry Marketing Technical Committee. The marketing practices and policies followed by producers of eggs in the Northeastern region were found to be most closely associated with size of flock.

JEHLIK, PAUL J., and LOSEY, J. EDWIN. RURAL SOCIAL ORGANIZATION IN HENRY COUNTY, INDIANA. Ind. (Purdue) Agr. Expt. Sta. Bul. 568, 58 pp., illus. November 1951. (BAE and various land-grant colleges and universities cooperating.)

The chief aspect of social change that has taken place in recent years in Henry County has been the growing urbanism of the rural areas. This has accompanied the introduction of decentralized industry.

MORTENSON, W. P., and GRAF, TRUMAN F. MARKETING WISCONSIN EGGS IN A SOUTHERN CITY. 19 pp. Madison. University of Wisconsin, Dept. Agr. Econ. [1951] (RMA; BAE Cooperating.) [Processed.]

This report presents the margin at each step in the marketing system from Wisconsin producers to Southern consumers, and the extent of the advantage to Wisconsin producers of selling their eggs on a graded basis.

NERVIK, OTTAR, and BLACK, JOHN D. RESEARCH IN SELLING AND BUYING WITH SPECIAL REFERENCE TO GOODS SOLD OR BOUGHT BY FARM PEOPLE. 65 pp. Cambridge, Mass. June 1951. (Harvard Studies in Marketing Farm Products No. 2-H.) (RMA; a contract report.)

Outlines a program of research in selling and buying as such, as something much more than physical handling of the goods which necessarily accompanies selling or buying, and analyzes the research methodology for such a program.

NORTH CENTRAL FARM MANAGEMENT RESEARCH COMMITTEE. CONSERVATION PROBLEMS AND ACHIEVEMENTS ON SELECTED MIDWESTERN FARMS. Ohio Agr. Expt. Sta. Special Cir. 86, 53 pp., illus. July 1951. (North Central Regional Pub. 23. Agr. Expt. Stas. of Ill., Ind., Iowa, Kans., Mich., Minn., Mo., Nebr., N. Dak., Ohio, S. Dak., Wis., and Farm Found. cooperating; RMA.)

Soil conservation problems in the Midwest include water and wind erosion, depletion of soil fertility, and inadequate drainage. Steps required to reduce soil losses or depletion differ for each problem and as between small and large farms; dairy and hog operation; skilled and ordinary managers; owned and rented farms; and well-financed and "shoe-string" operators.

OGREN, KENNETH E. AN ANALYSIS OF HOUSEHOLD PURCHASES OF CITRUS PRODUCTS BY 500 URBAN FAMILIES, NOVEMBER 1948—OCTOBER 1949. 51

[1] Processed reports are indicated as such. All others are printed. State publications may be obtained from the issuing agencies of the respective States.

pp., illus. Bur. Agr. Econ. December 1951. [Processed.]

The report analyzes the characteristics of consumer buying of frozen concentrated orange juice to ascertain whether this product has increased and will further increase the demand for all citrus.

ROBINSON, R. WAYNE. COTTON PRODUCTION PRACTICES IN THE UPPER COASTAL PLAIN AREA OF ALABAMA. Ala. Agr. Expt. Sta. Cir. 103, 31 pp. October 1951.

Reports results of a field survey made in four counties selected as representative of the Upper Coastal Plain Area to compare current cotton production practices with Experiment Station recommendations in order to point out where improvement is needed.

SOUTHERN, JOHN H., SCOGGINS, HAROLD, and WHITE, JOHN W. ARKANSAS LAND PRICES IN WAR AND PEACE. Ark. Agr. Expt. Sta. Bul. 517, 27 pp., illus. November 1951. (BAE Cooperating.)

At the beginning of World War II, landowners, tenants wishing to buy farms, returning veterans, organizations extending credit for purchases of farm land, and non-farmer investors were concerned over the prospects of another land boom and collapse. Because of this and because of the importance of land and building values in the financial structure of farms, this study of sales of land in Arkansas was begun in 1942.

STEWART, CLYDE E., and MYRICK, D. C. CONTROL AND USE OF RESOURCES IN THE DEVELOPMENT OF IRRIGATED FARMS: BUFFALO RAPIDS AND KINSEY, MONTANA. Mont. Agr. Expt. Sta. Bul. 476, 83 pp., illus. Bozeman, October 1951. (BAE Cooperating.)

These two projects featured governmental predevelopment of most of the farms, a significant departure from the usual methods of irrigation development.

STEWART, CLYDE E., and MYRICK, D. C. IRRIGATED FARM DEVELOPMENT IN BUFFALO RAPIDS AND KINSEY, MONTANA. Mont. Agr. Expt. Sta. Cir. 195, 22 pp. Bozeman. October 1951.

This circular is a shortened form of Montana Agricultural Experiment Station Bulletin 476, by the same authors.

STIPPLER, HENRY H. ELECTRICITY ON FARMS IN EASTERN WASHINGTON. Wash. Agr. Expt. Sta. Sta. Cir. 149, 77 pp. illus. July 1951 (RMA; BAE cooperating.)

This report gives the extent of consumption of electric energy, the individual uses, and the cost of electricity to farmers in an area of sparse settlement.

UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. CONSUMERS' USE OF AND OPINIONS ABOUT CITRUS PRODUCTS. U. S. Dept. Agr., Agr. Inform. Bul. 50, 167 pp., illus. October 1951. (RMA.)

The survey upon which this report is based was intended to provide information that would be helpful in promoting consumption of the major citrus crops. Data contained herein should be of value to those concerned with the production and marketing of these products, with subsequent benefit to consumers.

UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. NEW CONCENTRATED APPLE JUICE: ITS APPEAL TO CONSUMERS. Report of study in Tyler, Texas, and Modesto, California. 48 pp. November 1951. (Based on interviewing and tabulations made by the Field Research Company under contract; RMA.) [Processed.]

During the 10 weeks before consumer acceptance was measured, nearly 70 percent of the homemakers who had bought the product made repeat purchases and approximately 4 in 10 of those who had bought it had made four or more separate purchases during the 10-week period.

UPCHURCH, M. L., and BROWN, T. S. LAND, LIVESTOCK AND DEER IN THE MILFORD-DOYLE AREA OF NORTHEASTERN CALIFORNIA. Calif. Agr. Ext. Serv. Off. Farm Advisor. Susanville. 32 pp. November 1951. (BAE and Lassen County (Calif.) Agr. Ext. Serv. Cooperating.)

The problem of land, livestock, and game management in the area is especially acute on that part of the area which is winter range for deer and spring-fall range for livestock. The answer to range deterioration lies either in making less intensive use of the area or in producing more feed.

WALL, NORMAN J., GARLOCK, F. L., TOSTLEBE, A. S., BURROUGHS, R. J., LINGARD, H. T., JONES, L. A., and WALLACE, M. E. THE BALANCE SHEET FOR 1951 AND CURRENT FINANCIAL TRENDS OF AGRICULTURE. U. S. Dept. Agr. Agr. Inform. Bul. 73, 41 pp., illus. November 1951.

This is the seventh of a series of annual reports which are designed to carry forward the comparative balance sheet of agriculture since 1940.

WHITE, MORRIS, ROBINSON, R. WAYNE, and GLASCOW, ROBERT B. COTTON PRODUCTION PRACTICES IN THE BLACK BELT OF ALABAMA. Ala. Agr. Expt. Sta. Cir. 105, 32 pp. Auburn. December 1951. (BAE cooperating; Purnell Act Pub.)

Cotton producers in the area are faced with the problems of (1) the extent to which they should substitute machinery for man labor under existing economic conditions, and (2) the possibility of turning to alternative enterprises which have greater natural advantages over cotton production

Statistical Compilation

UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. LIVESTOCK AND POULTRY ON FARMS AND RANCHES ON JANUARY 1. NUMBER, VALUE AND CLASSES 1945-50, BY STATES. REVISED ESTIMATES. U. S. Dept. Agr. Statis. Bul. 106, 24 pp. February 1952.

AGRICULTURAL ECONOMICS RESEARCH

Is published quarterly by the Bureau of Agricultural Economics, U. S. Department of Agriculture. The printing of this publication was approved by the Director of the Bureau of the Budget, May 31, 1949.

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 20 cents a single copy, 75 cents a year, domestic, $1 foreign.